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GERALDSON (C. M.). **Cause and control of blossom-end rot of Tomatoes.**—*Circ. Fla agric. Exp. Stas.* S-101, 8 pp., 2 fig., 1957. [Received Oct. 1959.]

Summarizes information already noticed [**36**, 793; cf. **38**, 488].

SCHNEIDER (ROSWITHA). **Über das Auftreten von Ophiostoma piceae (Münch) H. et P. Sydow als Begleiter von Thomasiniana spec. bei einer Rindenerkrankung des Weißdorns.** [On the occurrence of *Ceratocystis piceae* in association with *T.* sp. in a bark disease of Hawthorn.]—*NachrBl. dtsch. PflSchDienst, Berl.*, N.F., **11**, 4, pp. 56–57, 2 fig., 1959. [Engl. summ.]

Studies at the Institut für Mykologie, Berlin-Dahlem, on a bark canker and branch dieback observed on *Crataegus* in 1955–57 in Krumbach, Rothaargebirge, showed that *Ceratocystis piceae*, isolated from the wounds, was not the sole cause of the disease, larvae of *T.* ? *crataegi* being consistently found under the bark. Attempts to infect healthy *Crataegus* spp. with the fungus were unsuccessful and it is concluded that the insect plays a leading part in the etiology of the disease.

BEĬLEN (I. G.). **Sclerotinia pseudotuberosa Rehm.** (Вредоносность, биология, экология). [*S. pseudotuberosa* (Harmfulness, biology, ecology).]—Сообщ. Ин-та Леса [*Soobshch. In-ta Lesa*], *1959*, 12, pp. 62–74, 1959.

From observations and analyses in the autumn of 1950 made on acorns from Byelorussia, the Ukraine, and the forest steppes of the Russian S.F.S.R., which were stored at the Forest Conservation Sta., the Forest industry establishments, and on State farms of the Tula, Voronezh, Rostov, and Stalingrad regions, it was concluded that the most harmful fungi were *S. pseudotuberosa* (60% infection and over in store) [cf. **38**, 341, 630], *Phomopsis quercella* (20% infection, the fungus is widespread and destructive), *Gloeosporium quercinum*, *Cytospora intermedia*, *Penicillium* spp., and for the Ukraine and Moldavia *Schizophyllum commune* also. The biology and ecology of *Sclerotinia pseudotuberosa* were subsequently studied. Mycelial growth and development in storage conditions was possible at 0–1° C. and under snow cover. Statistical methods, quantitative and qualitative, are advocated for the study of epiphytotics.

SCHWENKE (H. J.). **Untersuchungen über Sporenkeimung und Myzelwachstum von Septotis populiperda Waterman et Cash.** [Studies on spore germination and mycelial growth of *Septotinia populiperda*.]—*Phytopath. Z.*, **35**, 4, pp. 389–400, 1 fig., 3 graphs, 1959. [Engl. summ.]

At the Inst. für Forstpflanzenkrankheiten, Hann.-Münden, Germany, it was found that *S. populiperda* [**30**, 130; **34**, 684; **38**, 427], isolated from poplar in Schleswig-Holstein, has relatively high moisture requirements, the conidia germinating on malt agar most rapidly at 99 and 98% R.H. (min. 90–92%). For growth rate of the germ tubes and mycelium the opt. is 98% (min. for mycelial growth 88–86%). The opt. for germ tube growth is 21° C. and for the mycelium 19° (min. 0–2°, max. 28–32°). With increasing time of culturing on malt agar the temp. range diminishes. Unboiled poplar leaf extract at various concs. did not stimulate germination.

FRENCH (D. W.) & OSHIMA (N.). **Host bark characteristics and infection by Hypoxylon pruinatum (Klot.) Cke.**—*For. Sci.*, **5**, 3, pp. 255–258, 2 fig., 1959.

Further information is presented from the Inst. Agric., Univ. Minn., St. Paul, on the germination of ascospores of *H. pruinatum* [**38**, 39] on media prepared from the

outer stem tissues of *Populus tremuloides* and other *P.* spp. Stimulation by the phellem was 73% with *P. tremuloides*, the subtending green layer (cortex+part of secondary phloem) almost completely inhibited germination, as did the 2 layers of secondary phloem. This indicates that in areas such as branch axils, where the green layer is lacking, the fungus may find a favourable infection court [cf. **39**, 56.]

Boyer (M. G.). **Ascospore discharge in Mycosphaerella populorum Thompson.**—*Bi-m. Progr. Rep. Div. For. Biol., Dep. Agric. Can.*, **15**, 4, pp. 1–2, 1 graph, 1959.

Disks cut from leaves of *Populus deltoides* naturally infected by *M. populorum* [**35**, 646] were air dried and subjected to: (1) 5° C. for 15 days then −10° for 45 days; (2) 60 days outside (max. 13, min. −28°); (3) 60 days at 5°; (4) 60 days at room temp. (approx. 20°). The disks were then soaked in water for 12 hr. and placed on a layer of washed, sterilized sand at its water-holding capacity in Petri dishes with a microscope slide fixed to the lid to collect the spores, 10 disks from each treatment being subjected to 22–26°, 13–18°, or 7–13°. No discharge occurred at 7–13°, but it was active at 22–26°. A resting period of not more than 45 days at a temp. below freezing was necessary to induce the maturation of perithecia. It is thought that moderate spring temps. (20–26°) are probably sufficient to stimulate epiphytotic outbreaks on *P. deltoides* early enough in the growing season to reduce increment seriously.

Bier (J. E.). **Moisture relations in disease development with particular reference to canker diseases caused by native, facultative parasites.**—*Bi-m. Progr. Rep. Div. For. Biol., Dep. Agric. Can.*, **15**, 4, pp. 3–4, 1959.

Moisture levels stimulatory to canker development in bark [cf. **38**, 631, 720] have also proved important in the development of canker (*Fusarium lateritium*) [*Gibberella lateritia*] on *Populus trichocarpa* and on western hemlock [*Tsuga heterophylla*] (*Cephalosporium* spp.) [cf. **33**, 59]. Varying aspects of the relationship are discussed and factors concerned in raising or lowering turgidity from the critical value of 80% are noted. It is suggested that cuttings should be collected when their turgidity is above 80%, this level being maintained during dormancy by insertion of the bases in water or by sealing.

Rack (K.). **Untersuchungen über die elektrostatische Ladung der Lophodermium-Sporen.** [Studies on the electrostatic charging of *Lophodermium* spores.]—*Phytopath. Z.*, **35**, 4, pp. 439–444, 2 fig., 1959.

During experiments on the effect of wind on spore deposition at the Forstlichen Versuchsanstalt, Göttingen, Germany, and out of doors in 1957 among 5-yr.-old pine plants and in 1958 among 7-yr.-old the author found that under natural conditions the spores of *L. pinastri* initially bear a—charge, but that later a reverse occurs, as they were almost without exception + at a height of 1–1·6 m. Having the same charge as the substratum prevents the freshly discharged spores from adhering to their immediate surroundings. It is only later when carried to a greater height by the wind that the reverse takes place, so that they have an adhesive tendency towards the needles [cf. **36**, 776].

Fergus (C. L.). **The influence of environment upon germination and longevity of aeciospores and urediospores of Coleosporium solidaginis.**—*Mycologia*, **51**, 1, pp. 44–48, 1959.

At Pa State Univ. recently formed aecidiospores of *C. solidaginis* from *Pinus rigida* [cf. **36**, 70] and uredospores from *Solidago caesia* both gave opt. germination at 20° C., max. 30°–35°, min. under 6°. The min. time for the formation of germ

tubes was 16 hr. at the opt. temp. at which they reached a length of up to 400 μ in 24 hr. A correlation between the presence of a bright orange pigment in the protoplasm and germination was noted, the pigment always being in the terminal extending portion of the germ tube. Twice germ tubes of 2 aecidiospores were seen to anastomose. Exposure to 35° for 5 hr. and to 40° for 1½ hr. killed both aecidiospores and uredospores; under 1% survived for 120 days at −17°; at 8° the longevity of both was greater in a dry than in a humid atmosphere.

COCKERILL (J.). **Effectiveness of fungicidal applications on damping-off of Red Pine.** —*Bi-m. Progr. Rep. Div. For. Biol., Dep. Agric. Can.*, **15**, 4, p. 2, 1959.

A significant reduction in mortality and an increased seedling emergence [cf. **38**, 547] occurred after treatment with higher concs. of tersan, captan, and thioneb applied as drenches at weekly intervals at the rate of 0·5, 1, 1·5, 2, 2·5, 3, and 3·5 g./sq. ft. No significant difference was noted between the 3 chemicals either in mortality or emergence of pine seedlings. The results confirm that damping-off can be reasonably controlled by applying fungicides directly to the seed bed in the early stages of seedling growth [cf. **36**, 625].

BOULLARD (B.). **À propos des mycorrhizes du Pinus strobus L.** [On the mycorrhiza of *P. strobus*.]—*Bull. Soc. mycol. Fr.*, **75**, 2, pp. 194–200, 1959.

A table is given showing the anatomico-morphological types of mycorrhiza found on *P. strobus* in 2 localities in Lorraine, the genera of the fungi present on each tree being indicated in decreasing order of prevalence and the special character of the mycotropism of each specimen being shown, with the age in yr.

MELIN (E.), NILSSON (H.), & HACSKAYLO (E.). **Translocation of cations to seedlings of Pinus virginiana through mycorrhizal mycelium.**—*Bot. Gaz.*, **119**, 4, pp. 243–246, 1 fig., 1958.

Large amounts of Na^{22} (as NaCl) were absorbed within 48 hr. from a nutrient solution through the mycorrhiza produced by *Rhizopogon roseolus* [**36**, 716] in 10 months' old *P. virginiana* seedlings [cf. below] cultured aseptically. From the mycorrhiza the ions were readily translocated to root and shoot tissues.

WORLEY (J. F.) & HACSKAYLO (E.). **The effect of available soil moisture on the mycorrhizal association of Virginia Pine.**—*For. Sci.*, **5**, 3, pp. 267–268, 1959.

In studies at Beltsville, Md, seedlings of Virginia pine (*Pinus virginiana*) were raised in pots of mycorrhizal forest soil containing *Cenococcum graniforme* [*C. geophilum*: cf. **36**, 777] at 4 different moisture levels. The black mycelium constituted only about 10% of the mycorrhiza at relatively high soil moisture, but increased to 100% as the moisture decreased; this was due to the reduced root system and not to the increased number of short roots invaded/plant. Thus, the fungus is more vigorous as a mycorrhiza former under low moisture conditions than the white-mycelium types.

MEREDITH (D. S.). **The infection of Pine stumps by Fomes annosus and other fungi.** —*Ann. Bot., Lond.*, N.S., **23**, 91, pp. 455–476, 1959.

Some of this information on infection of pines (*Pinus sylvestris* and *P. nigra* var. *calabrica*) in East Anglian plantations has been reported [**38**, 713]. Wood, bark, or root samples were taken, wetted with tap water, and incubated for 4–5 days at room temp., the 1st being more reliable for recording infection within 1 yr. after felling than the 2nd; for isolating fungi 0·1 ml. 2·5 N lactic acid was added to agar before pouring to exclude bacteria. *F. annosus* [**39**, 59], *Peniophora gigantea*, *Stereum sanguinolentum*, and several blue stain fungi [**36**, 505] appeared soon

after felling: natural infection was reduced by covering stumps with cellophane sheets or coating the cut surfaces with creosote. Stumps of dominant trees were infected to the same extent as those of suppressed trees, but higher resin content in stumps increased their resistance.

In 1956–7 *P. gigantea* and *S. sanguinolentum* were most frequent in stumps produced during autumn and winter, while *F. annosus* was more frequent on those produced during spring and summer, probably because of competition with *P. gigantea*. Rate of invasion of stump roots by saprophytic fungi from soil or litter varied, not occurring until several months after felling. Stump infection was mostly ascribed to wind-borne spores [loc. cit.].

Zycha (H.) & Brand (W.). **Eine Methode zur Bestimmung des Grades der Zerstorüng von Fichtenholz durch Fomes annosus mit Hilfe des Mikroskopes.** [A method of estimating the degree of destruction of Spruce wood by *F. annosus* under the microscope.]—*Phytopath. Z.*, **35**, 4, pp. 411–419, 2 fig., 2 graphs, 1959. [Engl. summ.]

Starting from the well-known fact that wood-destroying fungi grow directly from cell to cell, the hyphae penetrating chemically the walls of wood cells [cf. **21**, 110] and leaving bore-holes as evidence of their growth, the authors give a full account of a new method devised at the Inst. für Forstpflanzenkrankheit, Hann-Münden, Germany, for detecting at an early stage the invasion of trees by *F. annosus*.

Wood samples cut into small shavings were macerated in 10% nitric acid plus 10% chromic acid (1:1) for approx. 24 hr., after which they readily disintegrated in water. At least 2 microscopic preparations were made from each sample and at least 13 unstained tracheid sections in each were examined with 8×40 magnification. As young wood is mostly attacked first and in the tracheids of older wood the penetrations can be detected only with difficulty, young tracheids, 25–70 μ wide, were examined, on each of which the number of bore-holes of up to 7·5 μ diam. per tracheid section of 410 μ (diam. of the field) were counted. After averaging, the figures were converted to a tracheid length of 1,000 μ.

To check the validity of the method small samples of wood were inoculated with *F. annosus* and the subsequent loss in weight assessed. The results obtained were confirmed.

Chen (S.-C.). **A preliminary study on flag rust of Spruce (Thekopsora areolata (Fr.) Magn.).**—*Acta phytopath. sinica*, **5**, 1, pp. 35–44, 6 fig., 1 graph, 1959. [Chin. Abs. from Engl. summ.]

In the Sun Chuen Basin, Szechuen province, flag rust (*T. areolata*) [cf. **15**, 618] infected 64·5% of *Picea asperata* and 30·7% of *P. purpurea*; the resistance of the latter is possibly because of an abundance of resin in the cones. Sand banks and altitudes of 3,210–3,400 m. above sea level are environments that favour the disease.

Shvartsman (S. R.). Новый род сумчатого гриба (сем. **Stictidaceae**) в Тянь-Шане [A new Ascomycete genus (fam. Stictidaceae) in the Tien-Shan.]—*Bot. Mater. (Notul. syst. Sect. crypt. Inst. bot. Acad. Sci. U.S.S.R.)*, **12**, pp. 224–228, 1 fig., 1959.

Neonaumovia tianschanica was found in various localities of the Tien-Shan, Kazakhstan, and Kirghizia in 1945–55. Ascomata are elongated, soft waxy, yellow, and immersed, measuring 1–15×0·3–1 mm., asci (8 spores) 70–105×10–16 μ, spores 15–25×5–10 μ, and paraphyses 70–80×3–5 μ. The fungus, new to science, is found on living and moribund needles of *Picea schrenkiana*, causing a deep reddening of the needles and subsequent desiccation of the young spruce.

Jacobs (H. L.). **Iron deficiency chlorosis of shade trees in eastern United States.**—*J.N.Y. bot. Gard.*, **9**, 5, pp. 165–168, 4 fig., 1959.

A popular note on symptoms, occurrence, and treatment.

Jacquiot (C.). **Étude comparée de Phellinus robustus (B. et G.) Karst. et de P. hartigii Allesch. et Schn. en culture.** [Comparative study of *Fomes robustus* and *F. hartigii* in culture.]—*C. R. Acad. Sci., Paris*, **249**, 16, pp. 1548–1550, 1959.

The marginal zone of colonies of 5 strains of *F. robustus* from the forest of Fontainebleau on malt extract was regularly circular, white, and the central ochraceous, the 2 often being separated by an intermediate zone of cadmium yellow. The aerial mycelium of 4 strains was profuse, compact, irregularly dented, cottony, and seldom zonate, while that of the 5th was sparser and thinner, with a few compact cushions; in both it was readily detachable from the medium. The obverse ranged from tawny-orange to dark chestnut. The mycelium was tenacious and could be cut only with difficulty. Colonies of 4 strains of *F. hartigii* (3 from the Vosges and 1 from Orne) were thin, with a lobate margin, generally uniform in colour, occasionally white over a very narrow zone, adpressed, fragile, the surface zonate and velvety, and the obverse very dark. In both spp. the medium became discoloured.

Clamp-connexions were absent from both spp. The secondary hyphae of *F. robustus* were hyaline, the tertiary yellow-greenish-ochraceous. In the aerial mycelium the hyphae were regularly cylindrical, moderately to very thick-walled, with few septa. Helicoid hyphae and those with vacuolar septa were fairly common. In contact with the medium the hyphae were thin-walled, multiseptate, the segments frequently being sinuous or convoluted. The few secondary hyphae of *F. hartigii* were hyaline, the tertiary multiseptate and comprising numerous swollen segments, some empty and others typical chlamydospores with dense contents.

At the opt. temp. of 26·5–29·5° C. *F. robustus* grew at the rate of 3 mm./24 hr., and *F. hartigii* (25·5–27°) only 1·5 mm.

Both spp. cause a fibrous, whitish rot [cf. **36**, 441]. *F. robustus*, one of the most active destroyers of intact oak and chestnut wood, has been estimated to cause av. bulk losses of 10, 17, and 21% after 4, 6, and 8 mm. of infection, respectively. On the other hand, the activity of *F. hartigii* is very limited, the av. bulk losses of fir [*Abies*] wood after 8 months reaching only 3·5%; it appears to be strictly saprophytic, whereas *F. robustus* induces progressive necrosis of the invaded cambium and lumen and stimulates cambial activity on the fringe of the infected area. This process was reproduced *in vitro* by the inoculation of cultures of chestnut cambial tissue.

The mycelia of the 2 spp. exerted a fairly strong reciprocal inhibitory effect. The association with *F. robustus* appeared to stimulate the normally almost non-existent activity of *F. hartigii* to form a moderately abundant mycelium.

It is apparent from these observations that the 2 spp. are morphologically and physiologically distinct.

Bocharova (Mme Z.), Vishnyak (M.), & Fedorova (Mme V.). Рост дереворазрушающих грибов при различных температурах. [The growth of wood-destroying fungi at different temperatures.]—*Refrig. Tech., 1958*, 5, pp, 41–43, 1958. [Engl. summ. Abs. in *Referat. Zh. Biol., 1959*, 15, p. 117, 1959.]

It was shown experimentally that *Coniophora cerebella* [*C. puteana*: cf. **38**, 432] develops slowly on wooden casks in the refrigerator at temps. down to −2° C. but stops growing at lower temps. though growth is renewed when temp. is raised again.

Johnson (T. W.), Ferchau (H. A.), & Gold (H. S.). **Isolation, culture, growth and nutrition of some lignicolous marine fungi.**—*Phyton*, **12**, 1, pp. 65–80, 1959. [*Biol. Abstr.*, **33**, 12, p. 3890, 1959.]

At Duke Univ., Durham, N. Carol., comparative studies were made of 21 cultures of lignicolous fungi isolated from wood panels in sea-water on 7 sea-water media. While certain differences in utilization of C and N sources were detected, in terms of colony diams. produced, the fungi were very variable in their growth. In tests of 35 species of wood in coastal waters some produced more numerous perithecia of *Lulworthia* and *Ceriosporopsis* than did others [cf. **39**, 92].

May (C.) & Palmer (J. G.). **Effects of asphalt varnish-fungicide mixtures on growth in pure culture of some fungi that cause decay in trees.**—*Plant Dis. Reptr*, **43**, 9, pp. 955–959, 7 fig., 1959.

In this study [cf. **38**, 631] 9 fungicides were mixed with asphalt paint (gilsonite varnish type) and tested on agar against 11 wood rotting fungi. The mixture containing 0·25 g. phenyl mercury nitrate in 99·75 g. asphalt varnish was the most effective in inhibiting growth. No other fungicide prevented the growth of all the fungi. This mixture should be effective enough to prevent the spread of decay fungi in paint or on tools.

Etheridge (D. E.) & Morin (L. A.). **A modification of the wood block decay test for studying imperfect fungi.**—*Bi-m. Progr. Rep. Div. For. Biol., Dep. Agric. Can.*, **15**, 4, p. 1, 1 fig., 1959.

This modification of Etheridge's method [**37**, 124] has also proved advantageous for studying the min. moisture requirements of fungi; it entails the transference of small plugs of agar from an actively growing plate of the test fungus to the bottom of a bore-hole in the block; the hole is then sealed with a sterile $\frac{3}{4}$ in. section of glass rod of $\frac{9}{32}$ in. diam. The rate of development of the fungus is measured by noting the number of days required for hyphae to grow through the $\frac{1}{4}$ in. of wood separating the inoculum from the surfaces of the block.

Courtois (H.). **Holzschutz an Offenstallbauten.** [Wood preservation in open-stable buildings.]—*Dtsch. Agrartech.*, **8**, 12, pp. 544–546, 4 fig., 1958.

Full directions are given for the treatment by standard methods, using oils, e.g. coal tar and xylamon, for parts of the structure accessible to livestock, and UA or UAll salts for those out of reach [see below].

Albrecht (K.). **Welche Imprägniermittel sind für das Holz in Offenställen geeignet?** [Which preservatives are suitable for wood in open stables?]—*Dtsch. Agrartech.*, **8**, 12, p. 547, 1958.

In addition to xylamon [see above], kulba, elbrosan (both salts), and ahopin (oil) are recommended, the necessary precautions in the use of each being indicated.

Baechler (R. H.), Conway (E.), & Roth (H. G.). **Treating hardwood posts by the double-diffusion method.**—*For. Prod. J.*, **9**, 7, pp. 216–220, 4 fig., 1959.

An account is given of exploratory experiments on the double-diffusion treatment [**38**, 108] of posts of 5 hardwood and 2 conifer species native to the S.E. United States with 3 different chemicals. The work, carried out as a co-operative project by the U.S. Forest Products Lab., the Southeastern Forest Exp. Sta., and the Sch. Forestry, Univ. Georgia, showed that the method offers promise and merits further investigation.

Kaper (J. M.) & Steere (R. L.). **Isolation and preliminary studies of soluble protein and infectious nucleic acid from Turnip yellow mosaic virus.**—*Virology*, **8**, 4, pp. 527–530, 1 fig., 1959.

At the Virus Lab., Univ. Calif., Berkeley, samples of turnip yellow mosaic virus purified by a butanol chloroform procedure, yielded an infectious ribonucleic acid (RNA) fraction when subjected to a modified heat denaturation procedure. In local lesion assays on young, rapidly-growing leaves of Chinese cabbage var. Wong Bok infectivity of the RNA was 0·1–0·5% of that of the same amount of nucleic acid incorporated in the whole virus. Ribonuclease (100–500 μg of the RNA fraction/ml. with 0·005 μg./ml. ribonuclease for 2 hr. at room temp.) caused complete loss of infectivity, while whole virus, at a conc. giving approx. equal numbers of local lesions, was unaffected by ribonuclease at 10 times the conc. under similar conditions. Dialysis of purified virus against 0·1 M phosphate buffer permitted the isolation of a water soluble protein which electron microscopy showed to consist of very small particles with a pronounced tendency to form, in addition to larger aggregates, small aggregates of approx. diam. 60 A, corresponding in size with the bumps observed on particles of the virus (Steere, *Biochem. Biophys. Cytol.*, **3**, pp. 45–60, 1958).

Wei (C.-T.), Shen (S.-L.), Wang (J.-L.), Zhang (C.-W.), & Zhu (Y.-G.). **Mosaic disease of Chinese Rape and other crucifers in eastern China.**—*Acta phytopath. sinica*, **4**, 2, pp. 94–111, 2 pl. (10 fig.), 1958. [Chin. Abs. from Engl. summ. Received Sept. 1959.]

Chinese rape (*Brassica napella*), *B. campestris* vars., Chinese cabbage, radish, and other cruciferous crops, but not *B. oleracea* vars., are affected by mosaic [**37**, 565], which causes occasionally over 90% loss, with 30% av. incidence. Infected plants exhibit combinations of vein-clearing, yellow or green veinbanding, mosaic, rugosity of the leaf lamina, dwarfing, and rosetting. The viruses from different hosts are cross-inoculable, but some strains do not infect Chinese rape, and none infect *B. oleracea* vars., by sap inoculation. Three viruses were differentiated by their physical properties and host reactions on Nungling 400 tobacco and *Nicotiana glutinosa*; 1 and 2 can both be subdivided into 2 strs. by their ability to infect Chinese rape. Virus 1 is a str. of turnip mosaic virus, from which it differs in not affecting the cabbage group. Virus 2 is a cucumber mosaic virus str., but has a lower thermal inactivation point (55° C.), lower dilution end point (1:1,000–3,000), only 2 days longevity *in vitro*, and induces local lesions on tobacco, in which typical cucumber mosaic virus only partially protects against it. The 3rd virus showed affinity to tobacco mosaic virus. Only virus 1 was found in the field in 1957 and it was easily transmitted by sap and by aphids, including *Myzus persicae* (100% transmission with 2 aphids/plant), *Rhopalosiphum pseudobrassicae*, and *Aphis gossypii*. This virus belongs to the non-persistent group, a single feeding enabling an active transmission of about 20 min. The virus is soil- but not seed-borne; it can infect several cruciferous weeds, of which only *Rorippa montana* is perennial, but as it is commonly infected it appears a probable source of inoculum for Chinese rape.

Vlasov (Y. I.). Мозаичное заболевание Капусты. [Mosaic disease of Cabbage.] —*Proc. Lenin Acad. agric. Sci.*, **24**, 8, pp. 43–44, 1959.

Investigations by the Central Asian Filial of the Inst. for Plant Protection showed that 10–15% of the cabbage in the Tashkent region was infected by Brassica virus 3 [cauliflower mosaic virus]. *Brevicoryne brassicae* was an efficient vector. The disease is not seed-borne, the stalks left in the field being the main sources of infection. The virus was also found on kohlrabi. Recommendations for control include destroying the stalks, isolation of cabbage nurseries, vector control, and seed selection.

Dimitrov (S.). Гостоприемници на гушата в България. [Hosts of clubroot in Bulgaria.]—*Bull. Plant Prot., Sofia*, **7**, 1–2, pp. 26–34, 1958. [Russ. summ.]

At the agric. Inst., Georgiï, Dimitrov, Sofia, 62 cultivated and 34 wild spp. of Cruciferae were examined for their susceptibility to *Plasmodiophora brassicae*. The soil was inoculated with a suspension containing 2,000,000 spores/cu. cm. at 10 l./sq. m. All cabbage vars., kohlrabi, savoy, cauliflower, and Brussels sprouts, as well as Chinese cabbage are very susceptible; the most resistant cabbage var. was Moskovskaya pozdnyaya. *Cheiranthus allioni* is very susceptible, *C. cheiri* slightly resistant, and on *Matthiola annua* root tumours do not form. Turnips, rape, and wild turnip are resistant, and radishes even more so, also fodder cabbage [? kale] and swedes. Of the wild plants tested 10 spp. did not form tumours, but infection was present in the root hairs where the parasite accomplished the 1st stage of its life-cycle.

Gurlev (A. S.), Platonova (Mme E. M.), & Prishchep (L. G.). Электрическая стерилизация почвы. [Electrical sterilization of soil.]—*Izv. Timiryazev agric. Acad.*, *1957*, 2 (15), pp. 219–229, 4 fig., 1957. [Received Oct. 1959.]

The author describes the apparatus used at the 'Krasnaya Gryada' State farm, Stalin district, Moscow. Greenhouse soil from under cabbage infected by clubroot [*Plasmodiophora brassicae*: **39**, 64] was electroheated to 99° [C.] for 30 min. at 58–63% soil humidity in a box sterilizer divided into sections by plate electrodes. The very susceptible cabbage No. 1 was sown on the day of sterilization. Incidence in the soil from between the electrodes was 5·8%, in that on the electrodes 11·4%, and the unsterilized 88·9%. The soil between the electrodes is probably drier than that on the electrodes. Complete control was obtained only when soil was heated for 63 min. at 99°. Heated soil gave 2½ times higher yield of the green matter than unheated soil.

Rubin (B. A.) & Ivanova (Mme T. M.). Окислительные превращения аминокислот при взаимодействии тканей Капусты с грибом **Botrytis cinerea.** [Oxidative transformation of amino acids in the interaction of Cabbage tissues with the fungus *B. cinerea*.]—*Biochemistry, Leningr.*, **23**, 4, pp. 540–546, 2 graphs, 1958. [Engl. summ. Received Nov. 1959.]

At the Inst. Biochem., Soviet Acad. Sci., Moscow, tissues of the cabbage var. Amager, resistant to *B. cinerea* [**37**, 331], oxidized amino acids more actively and contained 4–5 times more readily oxidizable amino acid than those of the susceptible No. 1. As a result of infection amino acid oxidase activity greatly increased in the resistant var. but not in the susceptible.

Jamalainen (E. A.) & Haavisto (M.). **Syysrypsin talvituhosienien torjuntakokeita käsittelemällä kasvustot fungisiideilla.** [Tests on the control of low-temperature parasitic fungi in winter Turnip Rape by treatment of stands with fungicides.]—*Maataloust. Aikakausk.*, **31**, pp. 38–44, 1959. [Engl. summ.]

Jamalainen (E. A.). **Abioottisista tekijöistä johtuvista Syysrypsin talvehtimisvaurioista.** [Overwintering damage in winter Turnip Rape caused by abiotic factors.]—Reprinted from *Suom. Maataloust. Seur. Julk.*, **94**, 8, 11 pp., 1959. [Engl. summ.]

Results of further tests (1955–58) [cf. **36**, 741] against *Typhula* sp. and *Sclerotinia sclerotiorum* [**38**, 683] at Tikkurila and in many localities in Finland are given. Verdasan applied in Oct. at 425 g. phenylmercury acetate/ha. was as effective as 100 kg./ha. brassicol or botrilex.

The 2nd paper notes that the cause of damage is partly physiological, resulting from lack of aeration in spring because of water from melted snow standing round the plants on a layer of still frozen soil, and partly owing to the attacks of *T.* sp. and *S. sclerotiorum* favoured by winter conditions [cf. **36**, 7].

Meier (W.). **Die Vergilbungskrankheit bei Zuckerrüben in den Jahren 1956–1958.** [Beet yellows disease in Sugar Beet in 1956–58.]—*Mitt. schweiz. Landw.*, **7**, 9, pp. 129–134, 1959.

From the Eidg. Landw. Versuchsanst., Zürich, the author reports that chemical control of aphids (peach aphid [*Myzus persicae*] and black beet aphid [*Aphis fabae*]) reduced infection by beet yellows virus [**36**, 676; **39**, 65] (av. for all experiments) by 56% in early sowings and 26% in late, but in almost all cases there was no yield increase over untreated beets. The results suggest that increased yield from aphid control can be expected only in years when aphid incidence is abnormally high.

Bercks (R.) & Stellmach (G.). **Über die antigene Wirksamkeit des Rübenmosaik-Virus.** [On the antigenic activity of Beet mosaic virus.]—*Phytopath. Z.*, **35**, 4, pp. 437–438, 1959.

At the Inst. für Virusserologie, Brunswick, Germany, it was found that, contrary to the contention of Chester [**17**, 126] and others, beet mosaic virus could be demonstrated serologically in the sap of mangold and beet plants, thus proving that the beet mosaic virus possesses antigenic properties.

Krexner (R.). **Neues über die Beizung des Rübensaatgutes.** [New information on the disinfection of Beet seed.]—*Pflanzenarzt*, **12**, 3, pp. 33–34, 1959.

Under Austrian conditions panogen at 600 ml./kg. seed gives satisfactory control of beet black leg [pathogen unspecified: cf. **38**, 554] and leaf spot (*Cercospora beticola*) [**38**, 287]. Infection by *C. beticola* (estimated as the number of sampled leaves having 300 or more spots) in plots sown with treated seed was 714, compared with 873 for a dry mercurial dressing at the same dosage, and 1,053 for the untreated.

Schneider (C. L.). **Greenhouse studies on Sugar Beet root rot caused by Aphanomyces cochlioides.**—Abs. in *Phytopathology*, **49**, 8, p. 525, 1959.

Soil inoculation of 30-day-old sugar beet plants, potted in steamed soil, with about 1,000,000 zoospores of *A. cochlioides* [**36**, 804] 50 ml. water resulted in symptoms of the chronic phase of root rot within 6 weeks; roots were discoloured and decayed and the foliage wilted. The 3 vars. of beet used, of differing susceptibility to seedling blight caused by this pathogen, differed similarly in their reaction to the chronic phase.

Khristova (Eleonora). **Botrytis cinerea Pers.**—важен и най-често срещан причинител на гнилене на техническото захарно цвекло при съхраняването му за зимна преработка. [*B. cinerea* the most important and the most frequent cause of the rotting of industrial Sugar beet during storage for winter usage.]—*Bull. Plant Prot., Sofia*, **7**, 3-4, pp. 53–60, 7 fig., 1958. [Russ., Fr. summ.]

At the Inst. of Plant Protection, Sofia, Bulgaria, in 1956–7 and 1957–8 the most frequent of 13 fungi isolated from rotted sugar beet were *B. cinerea* [cf. **35**, 339, 586 *et passim*] strs. 2 and 3, which differed both morphologically and biologically, *Fusarium* spp., *Penicillium*, and *Phoma* [*Pleospora*] *betae* in that order. They were the main cause of rapid rotting. Temps. of 1–5° C. proved unfavourable for *B. cinerea*, and should be used for storage. In the Petrech district also fodder beet was infected by *B. cinerea*, which was isolated from sugar beet treated with hydrated lime or with the German compound KP_2, and from untreated sugar beet. Str. 2 has much more abundant mycelium than str. 3, the sclerotia are large, black, and isolated, and the conidia smaller than in 3.

Gibbs (A. J.). **Docking disorder.**—*Plant Path.*, **8**, 3, pp. 93–94, 1 pl., 1959.

Sugar beet 'Docking disorder' [**36**, 816], first noted near Docking, Norfolk, in 1948, but since found in Lincs., Salop, Suffolk, and Yorks., occurs in sandy soils with pH over 6·5. The leaves of affected plants are small, often with signs of N or Mg deficiency, and may be thick and cupped. The taproot may be only 1–2 in. long or may be killed, the main laterals are often thick, and either or both may grow horizontally for some inches below the soil surface. They are characteristically covered with a 'beard' of dead or dying rootlets. Mangolds, wheat, and carrots are also affected. The condition was most prevalent in 1948, 1953, and 1958; it reappears in exactly the same patches every year and appears to be non-parasitic.

Cheo (C.-C.) & Tsai (S.-L.). **Virus diseases of legumes (Annual Report, 1957–1958).** —*Acta phytopath. sinica*, **5**, 1, pp. 7–11, 4 pl. (22 fig.), 1959. [Chin. Abs. from Engl. summ.]

At the Inst. Microbiol., Academica Sinica, Peking, seed transmission of soybean rugose mosaic and some unidentified viruses occurred in 5 vars. of soybean, 1 of *Phaseolus vulgaris*, and 2 of *P. angularis*. Ring spot mottle virus of *Dolichos lablab* was found to be sap-transmissible to broad beans, causing stem-blackening under certain conditions; it only infected *Nicotiana glutinosa* if it had passed through broad bean. The virus was aphid transmissible and had a dilution end point of 1:10,000 and thermal death-point of 50–60° C. Groundnut mosaic virus caused the production of small seeds. A tooth-tumour-like swelling vein virus on broad beans proved graft transmissible. A yellowing of lucerne was transmissible to soybean, *Dolichos lablab*, *N. glutinosa*, tobacco, and *Gomphrena globosa*.

Bercks (R.). **Serologische Untersuchungen über das Phaseolus-Virus 1.** [Serological studies on Bean common mosaic virus.]—*Phytopath. Z.*, **35**, 2, pp. 105–118, 4 graphs, 1959. [Engl. summ.]

At the Inst. für Virusserologie, Brunswick, the results of Beemster and Van der Want [**31**, 218] that the virus [**37**, 259] is serologically active were confirmed [but cf. **35**, 863], though excessive centrifuging may destroy this. Antisera with a titre of 1:2,048 were produced. In greenhouse tests, chiefly with bush bean var. Saxa [*P. vulgaris*], the virus could be demonstrated at all times of the year, though it was necessary to choose the right stage of growth to get a good reaction and sometimes to test several leaves of a plant.

The highest virus titre demonstrated in these experiments was 1:32. When young inoculated plants were kept in controlled chambers those at 10 and 30° C. reacted strongly, whereas those at 20° and those in the greenhouse reacted only in part. Demonstration of the virus in the field was only partially successful. Inoculations on plants of different ages showed the existence of resistance conditioned by age; plants inoculated with a weak isolate developed complete premunity to inoculation with a very strong one.

Zaumeyer (W. J.). **Vein necrosis, a virus disease of Bean.**—Abs. in *Phytopathology*, **49**, 8, p. 526, 1959.

This new lucerne mosaic virus str., isolated from pea in southern Idaho, differs from other known strs., including lucerne yellow mosaic and lucerne N viruses. On Bountiful bean [*Phaseolus vulgaris*] primary necrotic lesions are not discrete, veinal necrosis follows, and subsequently large, blotched, chlorotic areas. Trifoliate leaves pucker but do not mottle, and the veins become necrotic; petiole and stem necrosis, together with death of the growing point, may accompany severe infection. Local necrotic lesions on Pinto bean [*P. vulgaris*] resemble those caused by the type str., with veinal necrosis near primary lesions; the virus is seldom

systemic in this var. The host range resembles that of other strs. of lucerne mosaic virus [cf. **37**, 409], and its physical properties conform with the type str.; the virus was inactivated in 10 min. at 62–64° C., in 32 hr. at 78°, and withstood dilution of 1:4000.

Baldacci (E.) & Betto (E.). **Esame dell' efficacia fungicida per copertura e sistemica di alcuni antibiotici su Uromyces appendiculatus (Pers.) Lk.** [Tests of the fungicidal effect upon *U. appendiculatus* of some antibiotics applied by coverage and systemically.]—*Agricoltura ital.*, **58** (N.S. 13), pp. 289–301, 1958. [Fr. summ.]

In an artificially illuminated glasshouse 8 antibiotics were sprayed on or administered systemically through the roots to *Phaseolus vulgaris* plants, 15–20 days old, which were later inoculated by spraying with a uredospore suspension of *U. appendiculatus*. With spraying, distamycin (100 p.p.m.) was completely fungicidal, while griseofulvin (30 p.p.m.) reduced infection by 57% and chloramphenicol (300 p.p.m.) by 89%. The addition of glycerin (1%) and indoleacetic acid (1 p.p.m.) increased the effect of the griseofulvin in reducing infection by 95%. Griseofulvin was the only material that displayed any systemic activity. Streptomycin, patulin, pharmacitin, and aureomycin were useless, and actidione highly phytotoxic, even at 10 p.p.m.

Rackham (R. L.) & Vaughn (J. R.). **The effect of gibberellin and fungicides on Bean root rot.**—*Plant Dis. Reptr*, **43**, 9, pp. 1023-1026, 2 fig., 1959.

At the Wyo. agric. Exp. Sta., Laramie, trials with 7 chemical compounds at 3 concs., and 5 with added gibberellin [**38**, 63, 130] against *Fusarium solani* f. *phaseoli* [**37**, 618] on Great Northern bean [*Phaseolus vulgaris*] under glass showed that, while no control was obtained when the fungicides were applied alone, some of the combined treatments were effective. A drench of 5 ml. urea-formaldehyde or 1 ml. of vapam-48, with 5 p.p.m. gibberellin sprayed on the plants at the primary leaf stage, gave highly significant root rot control, and significant control with 1 p.p.m.

Maier (C. R.). **Effect of certain crop residues on Bean root-rot pathogens.**—*Plant Dis. Reptr*, **43**, 9, pp. 1027–1030, 1959.

At New Mex. agric. Exp. Sta., Univ. Park, residues of 11 plant spp. were tested for their effect on the relative populations of bean [*Phaseolus vulgaris*] root rot fungi, including *Fusarium solani* f. *phaseoli*, other *Fusarium* spp., *Rhizoctonia* [*Corticium*] *solani* [**38**, 66], and *Thielaviopsis basicola*. Root rot severity on Pinto beans and the frequency of occurrence of the fungi on isolation plates were employed as criteria for estimating the relative populations. Over a range of inocula soybean, barley, and sorghum residues reduced disease severity and populations of pathogenic fungi: no comparable effects were produced by cotton, maize, sesame, and Sudan grass; increases were obtained with lettuce, lucerne, *Sesbania*, and tomato residues. There was less root rot with finely ground residues with mixed inoculum than with coarsely chopped, and with mature or dry residues than with green.

Paul (H. L.) & Quantz (L.). **Über den Wechsel der Konzentration des echten Ackerbohnenmosaikvirus in Ackerbohnen.** [On the change in concentration of Broad Bean true mosaic virus in Broad Beans.]—*Arch. Mikrobiol.*, **32**, 3, pp. 312–318, 1 fig., 1959.

The conditions relating to the conc. of broad bean true mosaic virus [**37**, 619] in Brenstedts Schladener Kleine broad bean were studied at the Institut für landwirtschaftliche Virusforschung, Brunswick, by a spectral photometric method.

Cyclic fluctuations in conc. in individual leaves from different levels on the plant were coupled with a corresponding appearance of the symptoms. The only exceptions were inoculated leaves, which contained large quantities of virus but exhibited no symptoms. In contrast, stem internodes did not show any appreciable differences in virus content. An attempt is made to explain the conditions, analogies to the recovery phenomenon being indicated.

Vovk (A. M.). Вирус мозаики Лука и меры борьбы с ним. [Onion mosaic virus and measures for its control.] *Proc. Lenin Acad. agric. Sci.*, **24**, 2, pp. 27–31, 2 fig., 1959.

Onion mosaic virus [**24**, 397] is very widespread in Poltava, Khar'kov, Sumsk, Chernigov, and Kirovograd regions of U.S.S.R., causing often 50–100% loss. The virus was also noted in the Postov and Moscow regions. In the very susceptible Tsitausky var. the bulbs in the 2nd yr. of infection are 3 times fewer than in healthy plants, the number of the seeds is 5–6 times fewer. Infection decreases germination by 20–25%. The virus retains infectivity for 117 days in dry leaves at 20° [C.] and for 86 days in sap, and does not survive in sap diluted 1:100 or kept at 60° for 10 min. Multistage onion vars. are the main source of infection, as the virus is neither seed- nor soil-borne. Shallots and garlic appear to be immune, as all inoculations failed. Cucumber, tobacco, tomato, *Nicotiana glutinosa*, bean [*Phaseolus vulgaris*], thorn apple [*Datura stramonium*], gladiolus, tulip, and grasses were not susceptible to inoculation. Selection of resistant vars., rotation, and control of the vectors [loc. cit.] are recommended. All hybrids from Danilovski × Batun and Romanovsky × Batun are highly resistant.

Berry (S. Z.). **Resistance of Onion to downy mildew.**—*Phytopathology*, **49**, 8, pp. 486–496, 3 fig., 1 graph, 1959.

At the Univ. Calif., Davis, the reaction to *Peronospora destructor* [cf. **36**, 630] of the resistant str. 13–53 was compared with that of 2215 and 10 other susceptible strs. and vars. In field tests started in 1953 plants were generally spray-inoculated under suitable weather conditions. The resistant var. developed occasional infection of the older leaves and young leaf tips, the parts most infected in susceptible vars. and where water adheres in the greatest amount; the seed stalks of 13–53 proved immune in the field. The age of the plants (2–8 months) had no effect on infection.

Under controlled conditions infection was initiated after at least 2 hr. in a moist chamber at 10° C. and accelerated after 3 hr.; the degree of infection was reduced by dilution of the inoculum and increased if the wax bloom was wiped off before inoculation or if sporangiospores were applied in water rather than dry. The immunity of the seed stalks of 13–53 broke down under exposure to high humidity for long periods (6–11 hr. for initial infection, compared with 3 hr. for 2215). No correlation was observed between resistance and the size and density of stomata, structure of the bloom and the epidermis, or water deposit on plants and the contact angle.

There was no consistent relation between plant age and the extent of sporulation, but at all ages mycelial growth was less in 13–53 than in the other vars., particularly in the seed stalks; histological changes in the host and development of the pathogen during infection were not related to resistance. After sporulation, in both 13–53 and the other vars., necrosis developed rapidly and the pathogen died unless conditions favoured its further spread into healthy areas. Germ tube growth was similar on extracts of both 13–53 and 2215 leaves, and appressoria occasionally formed on agar media containing such extracts. Resistance apparently depends upon a factor which inhibits the pathogen and exists at different levels in resistant and susceptible strains, the effect of which can be modified by the spore load necessary for infection and conditions which affect this.

Kulik (M. M.). **Studies on pink root of Onions and Shallots and the causal organism Pyrenochaeta terrestris (Hansen) Gorentz et al.**—*Diss. Abstr.*, **19**, 12, pp. 3095–3096, 1959.

Of 15 chemicals tested in the greenhouse at Louisiana State Univ. only 2 were phytotxoic to onion seedlings at concs. which did not injure onion seed *in vitro*; 42 of 54 chemicals tested by the agar plate method significantly inhibited *P. terrestris* [**38**, 438] and 28 of these were significantly inhibitory in a modified filter paper disk test. In sand culture tests 23 of 50 fungicides reduced pink root in onion to 1% or less; 22 of 29 chemotherapeutants caused highly significant inhibition on agar plates, but only 3 of these produced similar results with the modified filter paper disk technique. None of the 29 reduced disease incidence to 1% or less when used as drenches in sand culture. In the field most chemotherapeutants gave negative results except in a few instances where disease incidence was significantly reduced. Of 23 wetting, sticking, and penetrating agents, only the solvent from Goodrite vinyl resin latex sticker improved the penetration of streptomycin sulphate (13 p.p.m. recovered) into onion plants sprayed with the mixture. The uptake of the antibiotic was quite irregular and inconsistent.

There was a considerable variation in pathogenicity among 91 isolates of *P. terrestris* from 1 field; 15 single spore isolates from a single pycnidium produced *in vitro* were highly pathogenic, their av. disease index being 100, compared with 87 for the parent material; the best fungal growth in modified Czapek's medium occurred at pH 8. Of 91 mycelial isolates 8 produced pycnidia, 10 others produced pycnidium-like bodies lacking spores and setae; the disease index for these 2 groups was much higher than that of the remaining 73 isolates.

Hawkins (J. H.), Ives (June V.), & Storey (I. F.). **Alternaria leaf blight of Carrots.**—*Plant Path.*, **8**, 2, p. 76, 1 pl., 1959.

In the late summer and autumn of 1958 reports of the killing of carrot foliage, starting in patches, with subsequent spread, were received from 3 growers in Norfolk, and 1 each in Cambs., Lincs., and Notts. Affected leaves bore *Alternaria dauci* [cf. **25**, 581; **31**, 164], not previously recorded from England or Wales. The older leaves were markedly more susceptible [cf. **24**, 46].

Marlatt (R. B.), Tucker (H.), & Stewart (J. K.). **Evaluation of chemical dips for control of decay in packaged Carrots.**—*Plant Dis. Reptr*, **43**, 7, pp. 741–744, 1959.

At the Ariz. Exp. Sta., Tucson, decay of inoculated carrots stored at 70–80° F. was generally reduced, though not eliminated, by dipping in 0·01% aqueous sodium hypochlorite. With storage at 40–50° such treatment was not necessary. Soft rot bacteria [unspecified: cf. **32**, 532] and *Mucor* sp. were commoner agents of decay than *Alternaria* sp. or *Penicillium* sp. In 1 of 5 tests the dip proved phytotoxic, causing increased decay by bacteria and *Penicillium*. Sorbic acid [cf. **36**, 203] was generally ineffective.

Condon (P.) & Kuc (J.). **A biochemical mechanism for the resistance of Carrot root tissue to attack by Ceratostomella fimbriata.**—Abs. in *Phytopathology*, **49**, 9, p. 536, 1959.

A phenolic ester (empirically $C_{11}H_{12}O_4$), possibly a dihydrobenzofuran, was produced by carrot roots after inoculation with *C.* [*Ceratocystis*] *fimbriata*. The substance is toxic to the pathogen, totally inhibiting its growth *in vitro* at 1×10^{-3} M and 60% at 5×10^{-4} M, and apparently accounts for resistance in carrot; sweet potato, which does not produce the compound after inoculation, is susceptible.

Smith (K. M.) & Short (Margaret E.). **Lettuce ringspot: a soil-borne virus disease.**—*Plant Path.*, **8**, 2, pp. 54–56, 1 pl. (4 fig.), 1959.

At the Virus Res. Unit, Cambridge, lettuce ring spot virus, a soil-borne, sap-transmissible virus present in lettuces, which produced local necrotic rings on leaves of White Burley tobacco, had a dilution end-point between 10^{-1} and 10^{-2} (with tobacco as a source plant and *Nicotiana glutinosa* as a test plant), withstood 50°–60° C. for 10 min., and had a longevity of 4–5 days at room temp. in tobacco sap. It was readily transmissible by rubbing with carborundum. Cross-protection tests, the similarity of the symptoms on certain hosts, particularly Telegraph cucumber, and the general similarity of the 2 viruses showed it to be a strain of tomato black ring virus [cf. **38**, 269]. The virus was first found in June 1956 in lettuces grown at Norwich.

Schnathorst (W. C.). **Spread and life cycle of the Lettuce powdery mildew fungus.**—*Phytopathology*, **49**, 8, pp. 464–468, 2 fig., 1 map, 1959.

Further studies at Univ., Calif. Davis [cf. **38**, 441], indicated that primary infection of lettuce by *Erysiphe cichoracearum* occurs each year in the same areas, where perithecia had formed plentifully in the previous season, and ascospores rather then conidia are considered to be responsible for initial infection, since the plants on which conidia had overwintered were turned in 3 months before new infections appeared. These were 1st observed in 1955 in July, increasing in 1 field, where perithecia had been found, from 0 on 25 June to 85% infection on 21 July. Spread was mostly with the prevailing wind, trapping of conidia on dry slides showing that most dissemination took place between midday and 4 p.m., with very little at night. Of the conidia trapped, 70% were in groups of 2 or more (up to 22), and apparently only the oldest, terminal spore of a chain causes infection. When colonies on the basal leaves averaged 67 leaf, dissemination was estimated to be 2×10^8 conidia/acre of lettuce 24 hr. Development of colonies was followed with celloidin strippings from detached leaf culture [loc. cit.]. Perithecia placed on moist filter paper at 15–22° C. burst and the liberated ascospores infected both lettuce and wild lettuce (*Lactuca serriola*).

Schade (Christiane). **Zur Frage der serologischen Verwandtschaft zweier Virus-isolate von Rhabarber mit dem Kohlrübenmosaik-Virus.** [On the question of the serological relationship of two virus isolates from Rhubarb with Turnip mosaic virus.] —*Phytopath. Z.*, **35**, 4, pp. 433–436, 1959. [Engl. summ.]

Of 2 virus isolates from rhubarb at the Phytopath. Inst., Martin Luther Univ., Halle-Wittemberg, Germany, 1 was related to turnip mosaic virus (herein regarded as synonymous with cabbage black ring spot virus)[cf. **36**, 4]. The 2nd, the rhubarb mosaic virus of Klinkowski [cf. **37**, 64], did not appear to be related to it.

Nienhaus (F.). **Rhabarberfäule durch Phytophthora cactorum (Leb. et Cohn) Schroet.** [Rhubarb rot caused by *P. cactorum*.] —*NachrBl. dtsch. PflSchDienst, Berl.*, N.F., **11**, 4, pp. 58–59, 4 fig., 1959.

This report from the Institut für Pflanzenkrankheiten, Bonn Univ., is apparently the 1st of this disease in Europe, in the lower Sieg valley near Bonn. The largest outbreak occurred in 1958 in a 14-acre plot where 30% of the 3-yr.-old plants growing under apple trees were affected. Further centres of infection in the Bergheim/Sieg district were found invariably where rhubarb was grown in orchards or on damp ground in the valley.

The disease started in the spring with the wilting of fully developed leaves as a result of a basal stalk rot, spreading rapidly in damp, warm weather to the entire stalk, the roots, and finally also the developing leaves. The diseased tissues were

watery, of light or brown colour. By June many infected plants were completely rotted.

At first, in spring, the only isolates were a *Pythium* sp. [cf. **26**, 225] and bacteria, which did not reproduce the rot on inoculation. In mid-June isolates of *Phytophthora cactorum* [**2**, 433] identical with those from apple trees with collar rot [cf. **37**, 667] were obtained and caused typical symptoms on inoculated 2-yr.-old Cox's Orange trees. In rainy periods weekly spraying with Bordeaux is recommended.

Šutić (D.). **Die Rolle des Paprikasamens bei der Virusübertragung.** [The role of Cayenne Pepper seed in virus transmission.] *Phytopath. Z.*, **36**, 1, pp. 84–93, 5 fig., 1959. [Engl. summ.]

In parts of Yugoslavia the cultivation of red pepper [capsicum] has been significantly affected by virus diseases; from the symptoms, cucumber mosaic and alfalfa [lucerne] mosaic viruses appear to be the most prevalent. In some areas in the Horgos region losses of up to 36% plants have been recorded. Studies at the Phytopath. Inst., Belgrade Univ., of *Capsicum annuum* seed from normal production revealed that 1–5 (av. 2)% transmitted lucerne mosaic virus, young seedlings showing symptoms at the cotyledon and 1st leaf stages, which permits early elimination of diseased plants. Spraying against aphid vectors is recommended.

Elenkov (E.). Срокът на засаждането влияе върху болестите по Пипера. [The time of planting affects disease incidence in Sweet Pepper.] —Градинарство [*Gradinarstvo*], **1**, 2, pp. 16–20, 1959.

At the 'Maritza' Inst. and in the Plovdiv region, Bulgaria, 5 sowings of pepper [*Capsicum* sp.] were made from the end of Apr. to mid-June. Infection by *Verticillium alboatrum* [**38**, 175] was highest in the first and last. In the Silistra region the highest incidence of [tomato] stolbur virus on Pazardzhishka kapya was recorded when plants were transplanted between 30 May and 21 June (av. 37%). Cucumber mosaic virus was most severe on the late-sown plants (24·2% compared with 1·7% on the early). Even with *Verticillium* wilt the early peppers are affected least, as by the time the disease develops most of the crop is harvested. Late sowings are uneconomical.

Garofalo (F.). **La concimazione potassica del Pepperone.** [The application of potassium to Capsicum.] Reprinted from *Coltiv. piemont.* **11**, 8, 6 pp. (unnumbered), 1 fig., 1958. [Received Aug. 1959.]

At Cuneo, Italy, from 15 June–10 July 1957 the weather favoured attack by *Phytophthora capsici* [cf. **37**, 435], *Rhizoctonia* [*Corticium*] *solani*, and *Fusarium* spp., which killed 54·6% of the plants given fertilizer without K as against only 30·6% given 6 q.K/ha. in addition.

Garofalo (F.). **Gli antibiotici nella lotta contro le malattie dei semenzai di Pomodoro e di Peperone in Borgo S. Martino.** [Antibiotics in the control of diseases in Tomato and Capsicum seed-beds in Borgo S. Martino.]—Reprinted from *Alessandria agric.*, **4**, 12, 4 pp., 1958. [Received Aug. 1959.]

In a trial on a number of market-gardens where 'moria' or wilt disease of tomato and capsicum in hot-beds and nurseries caused by *Pythium debaryanum* [cf. **36**, 681] and *Rhizoctonia* [*Corticium*] *solani*, had developed early in March, the beds were sprinkled with a solution of biomycin (a mixture of various [unspecified] antibiotics) [**34**, 169], 1·5 g./10 l. at 2 l./sq. m. At the end of the period in the hot-beds the treated plants had 0% infection in contrast to 70% in the untreated and 20%, 12%, and 8% for those treated with marisan, cryptosol, and ceresan,

respectively. Two further applications of biomycin were made, 10 and 15–20 days after transplanting, whereas 6 further treatments were needed with the other materials to control infection. The untreated plants, severely attacked by collar rot (*Phytophthora parasitica* and *C. solani*) and by *Botrytis cinerea*, were subsequently given 2 applications of biomycin at an interval of 10–12 days, which satisfactorily controlled these diseases.

Garofalo (F.). **Prove orientative di sterilizzazione del terreno con vapore fluente e con vapam 4-S in colture di Melanzana e di Peperone.** [Preliminary experiments on soil sterilization with live steam and with vapam 4-S in plantings of Eggplant and Capsicum.]—*Boll. Lab. sper. Fitop. Torino*, N.S., **20**, 1, pp. 59–78, 16 fig., 1957. [Received Aug. 1959.]

In experiments at 5 market-gardens and at the Istituto Bonafous, Turin, soil was treated with steam by means of a mobile apparatus designed to give complete sterilization to a depth of 15–30 cm. in 5–6 min. and to treat 10–15 sq. m. hr., or it was fumigated with vapam 4-S sprinkled at 1 l. 40 l. 10 sq. m. on the soil, which was again sprinkled with 50 l. water/10 sq. m. Later, eggplant and Quadrato or Rotondo capsicum seedlings were planted. Both methods gave good control of 'moria' or wilt disease [cf. above] of both hosts, caused in capsicum chiefly by *Phytophthora capsici* [**36**, 681; map 277] and *Fusarium oxysporum* [see below] and in eggplant by the latter.

Garofalo (F.). **Ricerche sui caratteri bio-patologici di tre Fusarium isolati da piante di Melanzana colpite da avizzimento in Piemonte.** [Researches on the biopathological characters of three species of *Fusarium* isolated from Eggplants affected by wilt in Piedmont.]—Reprinted from *Ann. Accad. Agric. Torino*, **100** (*1957–58*), 45 pp., 9 fig., 3 graphs, 1958. [Engl. summ. 86 ref.]

In further studies at the Univ. Turin on the wilt of eggplants in Piedmont caused by *F. oxysporum* [see above], *F. moniliforme* [*Gibberella fujikuroi*], and *F. scirpi* var. *caudatum* [cf. **36**, 446] it was found that the germination of conidia of all 3 organisms was highest on Cohn's medium, Hansen's, and eggplant broth of 6 media tested. Growth was opt. at pH 5·8–6·4, inhibited at pH 9·8, and slow at pH 2·5. The opt. temp. for conidial germination and mycelial growth was about 25° C., the min. near 10°, and the max. near 35°. Natural light and the illumination given by a 100 candle-power filament lamp, used during daylight or continuously, checked growth and sporodochial production, which were stimulated by darkness; the alternation of day and night induced zonation. Wound and contact inoculations of young eggplants resulted in the penetration of the host tissues by the 3 organisms. The culture liquids of the fungi were ascertained to contain a thermostable, dialysable toxin, apparently identical with that obtained from other *F.* spp. by Winstead and Walker [cf. **33**, 748], which caused wilting of eggplants.

Markov (M.). Антракноза по Патладжана (**Colletotrichum melongena Lobik**). [Eggplant anthracnose (*C. melongena*).]—*Bull. Plant Prot., Sofia*, 7, 1–2, pp. 47–51, 2 fig., 1958. [Russ. summ.]

A preliminary report from the Res. Sta., Pavlikene, Bulgaria, of a disease observed on eggplants for the 1st time in the Plovdiv region and caused by *C. melongena* [**8**, 811], which induced extensive lesions, resulting in complete rotting of the fruit. The disease was probably introduced on a foreign var., perhaps from Romania where it was observed in 1953. All 12 vars. tested proved susceptible, particularly Izraelski and Yu-Pin-Sai. Avoidance of infested soil, seed disinfection with 1% formalin (10 g. l.) for 10 min. or 1% Hg sublimate for 5 min., and destroying all plant debris from infected fields are recommended.

Kapoor (J. N.) & Hingorani (M. K.). **Alternaria leaf spot and fruit rot of Brinjal.** —*Indian J. agric. Sci.*, **28**, 1, pp. 109–114, 2 fig., 1958.

A. tenuis was the cause of this disease of eggplant at the Indian agric. Res. Inst., New Delhi, in 1952–3, believed to be a new host record. During the rainy season it attacked young seedlings, which became blighted, charred and died. In Sept. small, circular, brown, necrotic leaf spots with a chlorotic halo were formed; they gradually enlarged and coalesced, causing withering and shedding of the leaves. Fruit lesions were small (= ½ cm.), concentric, dark brown, and sunken, becoming olivaceous due to spore formation, coalescing and sometimes covering the entire surface. The pathogen was seed transmitted. Opt. temp. for growth in culture and for spore germination was 28–29° C. Potato, tomato, and *Hyoscyamus niger* were found to be susceptible on inoculation with the eggplant isolate.

Chen (Y.-X.) & Wei (C.-T.). **A preliminary study on the identity of mosaic viruses from cucurbits in the vicinity of Nanking.** —*Acta phytopath. sinica*, **5**, 1, pp. 1–6, 1959. [Chin. Abs. from Engl. summ.]

At Nanking agric. Inst. 6 virus isolates from mosaic on cucumber, *Luffa cylindrica*, muskmelon, squash, white gourd (*Benincasa hispida*), and watermelon were classed into 2 groups: those from the first 2 hosts had a wide host range, while the remaining 4 were infectious only to Cucurbitaceae. That from cucumber was cucumber mosaic virus and that from *L. cylindrica*, because of its higher resistance to temp. (80–85° C.), dilution (10^{-5}–$5 \cdot 10^{-5}$), and ageing (30 days), was identified as a var. of it. The other 4 isolates are considered to be strs. of muskmelon mosaic virus [**27**, 271], but that from muskmelon differed in not infecting watermelon.

Shvorneva (Mme A. M.). Болезни бахчевых культур. [Diseases of Cucurbit crops.]—*Sad i Ogorod*, **96**, 7, pp. 32–35, 4 fig., 1958.

The most widespread are *Colletotrichum lagenarium* [**16**, 228] on melons and watermelons, *Fusarium* [*bulbigenum* var.] *niveum* on watermelons [**15**, 309], and the [unspecified] bacterial disease, green spot of pumpkin. *C. lagenarium* occurs in the Ukraine, N. Caucasus, W. and E. Siberia, the Far East, and the irrigated areas of the Volga basin. Very high losses occur in years favourable for its development. In some years the harvest is a total loss in the Ukraine and irrigated Volga areas. Melon and watermelon vars. vary in susceptibility. In 1945 in the Bŷkovskaya Station area under conditions favourable for infection all vars. were heavily attacked, but the Biryuchekytskiĭ 823 watermelon, and the Kolkhoznitsa melon were noticeably more resistant.

F. b. var. *niveum* is widely disseminated in all cucurbit cultivation areas—the N. Caucasus, Transcaucasia, the Ukraine—but is more frequently encountered in the steppe areas of the Volga region. Losses in individual circumstances reach 50–100%. All watermelon vars. at the Bŷkovskaya Experimental Station proved resistant, the highest resistance being shown by Pobeditel' 395, Volzhskiĭ 7, Belosemyachko 187, and Bŷkovskiĭ 22.

Green spot of pumpkin occurs in the Lower Volga area. Only ripe or nearly ripe fruit becomes infected, and the disease is encountered mostly in storage. The following are resistant: Mozoleevskaya of the *pepo* (summer squash) types, Perekhvatka of the *moschata* (crooked-necked squash), Belaya 3, and Medovaya Belaya 611.

Tafradzhiĭski (I.). Брашнестата мана по Краставиците при оранжерийното и парниково производство и борбата с нея. [Powdery mildew on Cucumbers in the greenhouse and hothouse industry and its control.]—Градинарство [*Gradinarstvo*], **1**, 1, pp. 22–25, 1959.

The most severe and damaging disease on greenhouse and hothouse cucumbers

in Bulgaria is powdery mildew (*Erysiphe cichoracearum* and (more widespread) *Sphaerotheca fuliginea*) [cf. **37**, 567 and below]. In 9 districts of the country the disease caused more than 50% loss in 1958. Plants near the heating pipes and the entrance were the most affected. The temp. in the houses should be 25–28° C. Lime-sulphur, 1:80, caused slight leaf scorch. The best control is given by 1% barium peroxide applied at the 1st signs of mildew or in Nov. and Dec. before symptoms appear. Against severe attack spraying every 7–8 days is necessary.

Videnova (Evgeniya). Ефикасно средство против брашнестата мана по Краставиците. [Efficient measures against powdery mildew of Cucumber.] —Градинарство [*Gradinarstvo*], **1**, 5, pp. 20–22, 2 fig., 1959.

In the winter of 1958–9 cucumbers produced in all greenhouses in Bulgaria, especially in the Velingrad region, were badly damaged by *Sphaerotheca fuliginea* [see above]. In tests for its control with karathane (75–100 g., 100 l.), zineb (200 g.), and colloidal S (100 g.) it was evident that karathane was best. Spraying was done on 27 Feb. 1959 at the 10–12-leaf stage, the beginning of flowering. Only the S caused slight scorching of the leaves. Karathane sprays at 75 g./100 l. for normal infection and 100 g. for severe should be applied every 5–6 days, beginning with the 1st appearance of symptoms; the compound is non-toxic to bees.

Boyadzhiev (K.). Угловати петна по листата на Краставицата. [Angular spots on the leaves of Cucumber.]—Градинарство [*Gradinarstvo*], **1**, 1, pp. 26–27, 1 fig., 1959.

In 20 different nurseries in Bulgaria the cucumber vars. Delicatess, Eva, Grohlizer, Forgebirges Trauben, and Chinezische Schlangen imported from E. Germany were severely affected by *Pseudomonas lachrymans* [**34**, 510], which was favoured by the warm, wet spring of 1958. The disease seems to be imported with the seed. All German vars. tested proved very susceptible.

Quarantine restrictions are to be imposed on all cucumber seeds imported from E. and W. Germany. Temp. of the hothouses should be increased from 25 to 34° C. Seed disinfection with organo-Hg compounds immediately before sowing is recommended.

Katsura (K.). **A Phytophthora rot of Watermelon caused by P. drechsleri.**—*Sci. Rep. Fac. Agric. Saikyo Univ.* 10, pp. 77–85, 2 pl. (11 fig.), 2 fig., 1958. [Jap. Abs. from Engl. summ. Received 1959.]

P. drechsleri [map 281], a new record for Japan, was found to be the cause of this disease of watermelon [cf. **35**, 269], which has been noticed since 1950. It appears after June and reaches its peak from the middle to the end of July, occurring mainly after rain. The disease is especially common in fields which have been under rice. The 1st symptom on the fruit is a small, circular, sunken, water-soaked dull green lesion about 1 cm. in diam., which rapidly increases to a large, reddish-brown, water-soaked area. The lesions are covered with a white, powdery and non-zonate sorus, which forms sporangia in abundance in dry weather. The fungus grows in culture from 9–10° to about 37° C. (opt. about 30°). Seeds are not infected. The fungus also attacks watermelon stems, leaves, roots, and seedlings, in addition to both sound and damaged fruit. Infection was also induced by inoculation in fruit of cucumber, eggplant, and plum, on carrot roots, and on pods of kidney bean [*Phaseolus vulgaris*].

Ramsey (G. B.), Smith (M. A.), Beraha (L.), & Wright (W. R.). **Pellicularia rolfsii on Mexican and Texas Watermelon.**—*Plant Dis. Reptr*, **43**, 9, p. 1031, 1 fig., 1959.

In the Chicago market in 1959 the rot caused by *P.* [*Sclerotium*] *rolfsii* on water-

melons, seldom serious in U.S.A., resulted in considerable loss of Mexican watermelons (9·6–30%) and the disease was also observed on a carload of melons from Texas (4% loss).

Buxton (E. W.). **The occurrence of Fusarium wilt of Melon in Britain.**—*Plant Path.*, **8**, 3, pp. 96–97, 1 pl., 1959.

From wilting and dying melon plants under cloches at Chorleywood, Herts., in 1956 and 1957, *F. oxysporum* f. *melonis* [cf. **37**, 625; **38**, 564] was consistently isolated and shown to be highly virulent to the melon vars. Blenheim Orange, Hero of Lockinge, and Tiger, and mildly virulent to Best of All, but to have no effect on cucumber or vegetable marrow.

Ashworth (L. J.). **The relation of total sugars to susceptibility of Persian Melon seedlings to Macrophomina phaseoli.**—Abs. in *Phytopathology*, **49**, 9, p. 533, 1959.

When the hypocotyls of Persian melon seedlings grown aseptically on agarized Hoagland's solution were inoculated with *M. phaseoli* [cf. **37**, 623] 3 in. above the agar surface, plants on solution unmodified or +0·1% dextrose were highly resistant to infection, many on the media with dextrose at higher rates being killed within 32 hr. Total sugars in comparable healthy plants were: unmodified solution, 950 μg. sugars g. fresh wt.; 0·25% dextrose, 1,375; 0·5%, 3,690; 1%, 5,825, indicating that high sugar conc. in the seedlings predisposed them to infection.

Neklyudova (Mme E. T.). Болезни Кабачков и меры борьбы с ними. [Diseases of Pumpkins and measures for their control.]—Консерв. Овощ. Пром. [*Konserv. Ovoshch. Prom.*], **14**, 8, pp. 30–31, 1959.

In the last few years in 5 pumpkin producing regions of the S. part of U.S.S.R. an extensive rot of pumpkin flowers, caused by *Pythium* sp. [cf. **37**, 623] and *Rhizopus* sp. [loc. cit.], was most damaging to the buds and later to the fruits. Increasing pollination by keeping bees in the field increased yields by more than 100%, even in wet years, and bud rot incidence was considerably reduced. Spraying with 1% Bordeaux mixture at the beginning of flowering and every 10–15 days, ensuring extensive soaking of the parts near the roots, considerably decreased the rot in the North Ossetiĭ and Chechen-Ingushskiĭ regions.

Capoor (S. P.) & Varma (P. M.). **A mosaic disease of Papaya in Bombay.**—*Indian J. agric. Sci.*, **28**, 2, pp. 225–233, 1 pl. (11 fig.), 1958. [23 ref.]

Most of the information in this detailed account of papaw mosaic virus has been noticed [**28**, 131; **35**, 280; cf. **36**, 706]. It is readily transmitted by grafting; *Myzus persicae* is the most efficient vector, others including *Aphis medicaginis* and *Macrosiphum sonchi*.

McTeague (D. M.), Hutchinson (S. A.), & Reed (R. I.). **Spore germination in Agaricus campestris L. ex Fr.**—*Nature, Lond.*, **183**, 4677, p. 1736, 1959.

Recent experiments at the Bot. and Chem. Depts, Univ. Glasgow, showed that germination of spores of *A. campestris* was stimulated by a volatile metabolite secreted by the mycelium: it is probable that the substance is 2:3-dimethyl-1-pentene.

Staněk (M.). **Klíčení basidiospor pěstovaného žampionu Agaricus hortensis (Cooke) Pilát. II. Plynný stimulátor klíčení produkovaný Myceliem Agaricus hortensis.** [The germination of the basidiospores of cultivated mushroom—*A. bisporus*. II. The volatile stimulant of germination, produced by mycelium

of *A. bisporus*.]—*Čes. Mykol.*, **13**, 4, pp. 241–251, 5 fig., 2 graphs, 1959. [Engl. summ.]

At the agric. Inst., Ruzyň, metabolic products from mushroom mycelium were found to stimulate germination of its basidiospores [cf. above]. The stimulant is a volatile substance which diffuses through the medium. All viable spores germinated after 12 days at 25° C. on an agar medium containing carbohydrates and mineral salts but when the stimulant was present germination occurred in 7 days. The stimulating effect was observed even when the spores were exposed for only 24 hr. in an atmosphere containing the volatile products. The stimulant was also effective on basidiospores from wild mushrooms. Products of *Ustilago zeae* [*U. maydis*], *Alternaria tenuis*, and *Fusarium oxysporum* failed to stimulate basidiospore germination, and *Penicillium* and *Aspergillus* spp. were inhibitory.

Gorshkov (L.) & Klyushkina (Mme N.). Использование торфа для выращивания Шампиньонов. [The use of peat for growing Mushrooms.]—*Sad i Ogorod*, **96**, 8, pp. 26–27, 1958.

In experiments at the Central Peat Bog exp. Sta. U.S.S.R. in 1957, a yield of 10·105 kg./sq. m. was obtained with horse manure compost and 8·64 kg. with horse manure in the upper layer and peat and cow dung in the lower. With a 2:1 mixture of horse manure and top peat (ligneous sphagnum peat, 30% decomposed, pH 4·4) in the bottom layer, yield was 7·603, and with a 2:1 mixture of horse manure and bottom peat (ligneous sedge peat, 60% decomposed, pH 7) in the bottom layer, it was 7·225.

Baker (K. F.) & Matkin (O. A.). **An unusual occurrence of Morels in cultivated beds of Cymbidiums.**—*Plant Dis. Reptr*, **43**, 9, pp. 1032–1033, 1959.

Commenting on an unusually abundant growth of morels (*Morchella esculenta*), the source of inoculum for which was uncertain, but which appeared on newly planted raised beds of cymbidiums in a Californian nursery in 1956, the authors note that the growth occurred on slightly charred, ground fir bark which had been fumigated with methyl bromide and suggest this as a possible medium for commercial production of morels.

Vuittenez (A.). **Étude sur l'inactivation de divers virus phytopathogènes en présence de tissus de Vigne, et tentatives de transmission des virus de la 'dégénérescence infectieuse' à des plantes tests herbacées.** [Study on the inactivation of several phytopathogenic viruses in the presence of Vine tissue, and attempts at transmission of the viruses of 'infectious degeneration' to herbaceous test plants.]—*C. R. Acad. Agric. Fr.*, **45**, 3, pp. 123–130, 1959. [32 ref.]

At the Sta. de Pathologie Végétale, Colmar, vine leaf sap was found to have an inhibitory effect on tobacco mosaic virus, cucumber mosaic virus, and lucerne mosaic virus, but not on potato virus X. Attempts to transmit infectious degeneration virus [**36**, 166] mechanically from affected vines were negative. The author concludes that the experiments made by Ochs [**37**, 754; **38**, 443] should be critically analysed before assuming any connexion between this virus and cucumber mosaic virus or potato viruses X and Y.

Fogliani (G.). **Considerazioni sulle attuali ricerche delle malattie da virus nella Vite in Portogallo.** [Notes on researches in progress on virus diseases of the Vine in Portugal.]—*Ann. Fac. Agr. Milano*, N.S., **6**, pp. 25–43, 1957. [13 ref. Received July 1959.]

Investigations made during a 4-month stay in Portugal are briefly described, with special reference to the symptoms, transmission, and control of 'urticado' [cf.

30, 303] and 'infective chlorosis' which are stated to be distinct viroses. 'Urticado' or 'infective short node' is widespread Some of the symptoms agree with those of 'infective malformation' (= 'troubles infectieux de la morphogenèse' or 'infectious disturbances of morphogenesis') [cf. **36**, 165; **37**, 569 *et passim*]. 'Urticado' accentuates the picture presented by 'infective malformation' and causes leaf malformation, shedding of the fruits, and a conspicuous reduction in growth making plants dwarfed and bushy; there is also an intense mosaic on malformed leaves.

'Infective chlorosis' (infectious chlorosis or panachure) [**38**, 557] is characterized by an intense chlorosis of the whole or of part of the leaf blade. Brief notes are also given on 4 other virus conditions affecting vines in Portugal, the symptoms of which are not yet clearly distinguished.

Refatti (E.). **Clorosi riprodotte per innesto nella Vite e clorosi da ferro-carenza nella Vite e in altre specie vegetali : Nota I.** [Chloroses of the Vine reproduced by grafting and iron deficiency chloroses of the Vine and other species of plants: Note I.] —*Ann. Fac. Agr. Milano*, N.S., **6**, pp. 89–142, 15 fig. (8 col.), 1957. [Engl. summ., pp. 139–141. 55 ref. Received July 1959.]

A description is given of various forms of chlorosis observed in the Trentino-Alto Adige area on vines, and of an interveinal chlorosis noted in the same locality on apple, pear, apricot, and other trees and cultivated and wild herbaceous plants. Evidence from trials involving (*a*) the use of oats as indicator plants, (*b*) the direct administration of Fe, Mg, and Mn to shoots with chlorotic leaves, using the method of absorption through the midrib, (*c*) the application of Fe chelates to the soil, and (*d*) grafting vines, demonstrated that the interveinal chlorosis noted in trees and herbaceous plants was caused by Fe deficiency [cf. **31**, 191]. In vines, however, in addition to this, 2 forms of virus origin transmissible by grafting were distinguished. From a survey of the literature on infectious degeneration and other virus and virus-like diseases of the vine [cf. **38**, 356 *et passim*] it is concluded that these 2 forms of chlorosis belong, respectively, to the 'mosaic' and the 'infectious yellows' symptom groups. The 'mosaic' symptoms appear to be closely allied to, or identical with, those reported from Italy as 'mosaic' by Petri [**11**, 21; **12**, 419], from France as 'true mosaic' by Du Plessis [**30**, 304] and 'mosaic' by Vuittenez [**36**, 166], and from Switzerland as 'mosaic' by Gallay [**36**, 165]. The 'infectious yellows' symptoms are allied to or identical with Gallay's 'panachure' [cf. above] in Switzerland and other countries and Hewitt's yellow mosaic in the U.S.A. [**34**, 343].

Hewitt (W. B.) & Goheen (A. C.). **Asteroid mosaic of Grapevines in California.** —Abs. in *Phytopathology*, **49**, 9, p. 541, 1959.

First observed in 1953 [**34**, 343], asteroid mosaic virus has been transmitted by chip-budding or grafting to 6 vine vars. If numerous, the leaf spots are somewhat translucent and occur chiefly between the primary and secondary veins. The leaves are often malformed and puckered along the veins, marginal sinuses are deep-cut, and in some vars. green blisters occur. During summer, leaf symptoms become less severe but affected vines are often stunted and fruit poorly.

Grünzel (H.). **Studien zur Taxonomie und Nomenklatur des falschen Mehltaues der Weinreben (Peronospora viticola de Bary).** [Studies on the taxonomy and nomenclature of downy mildew of Vines (*Plasmopara viticola*).] —*Zbl. Bakt.*, Abt. 2, **112**, 11–15, pp. 454–472, 2 fig., 1959. [166 ref.]

On the basis of exhaustive critical studies of the taxonomic literature at the Institut für Phytopathologie, Naumburg/S., Germany, the author presents evidence for the acceptance of *Peronospora viticola* de Bary for the vine downy mildew fungus.

Young leaves of *Ampelopsis heterophylla* and *A. brevipedunculata* were successfully

inoculated with material from Gutedel vine. The fungus was carried through several generations on the *A.* spp. and reinoculated into vine, *Vitis pagnuccii*, and *V. rupestris*.

Calendario d'incubazione della Peronospora della Vite. [Incubation calendar for *Plasmopara viticola* on Vine.]—32 pp., 4 fig., Voghera, Pio Istituto Agricolo Vogherese 'C. Gallini', 1958 (12th edition).

This edition of the spray calendar for forecasting downy mildew outbreaks [**34**, 767; **37**, 570] in Italy, published in the usual form, contains a brief account by E. Baldacci of 18 yr. work by the local observatories functioning in association with the Vogherese Institute and a discussion of the data collected. During 1941–57 an outbreak occurred 6 times in the 2nd 10 days of May, 7 times in the 3rd, and 4 times in June, always when a min. temp. of 10° C. persisted, with rain later.

Raikov (E.) & Nexov (S.). Нови препарати за борбата с маната по Лозата. [New compounds for the control of Vine mildew.]—*Bull. Plant Prot., Sofia*, **7**, 3–4, pp. 35–51, 1958. [Russ., Engl. summ.]

At the Pleven Inst. of Viticulture and Wine-making, Bulgaria, 1953–58, tests were made on the susceptible var. Bolgar with 21 Cu and non-Cu compounds against mildew [*Plasmopara viticola*: **38**, 443]. Intermediate, untreated rows infected by mildew in early spring provided infection. Vitigran (50% Cu oxychloride and 50% base) at 0·4–0·5% gave the best control: 94·4% healthy grapes, and 83·3% healthy leaves compared with 31·3 and 0% in the untreated. The last 2 sprays with vitigran must be made simultaneously with 1% Bordeaux mixture for better adhesion. Copper oxychloride dust (15% Cu), applied at 1·5–2% gave very satisfactory results during periods of rain or heavy dew. Of other materials used, some protected the grapes but were washed off the leaves, while others spoilt the fruit and could only be used up to flowering; all controlled mildew, provided the last 1 or 2 sprays were accompanied by 1% Bordeaux. The non-Cu compound etalon at 1%—Bordeaux gave a very good control on both leaves and grapes, and 0·5% Bordeaux +0·2% naphtol was more effective than Bordeaux alone and proved economically very satisfactory.

Gambaryan (G. S.). Применение новых фунгицидов в борьбе против мильдью Виноградной лозы. [The use of new fungicides in the control of Vine mildew.]—Бюлл. науч.-тех. Информ. Арм. н.-и. Ин-та Виноградарст. Винодел. Плодовод. [*Byull. nauch.-tekh. Inform. Arm. n.-i. In-ta Vinogradarst. Vinodel. Plodovod.*], *1958*, 2, pp. 23–24, 1958. [Abs. in *Referat. Zh. Biol., 1959*, 17, p. 200, 1959.]

At the Institute's Erevan experimental base and at the State farm Zaitun in the Noemberyan area in 1957, zineb 0·3, 0·5, and 0·75% and fuclasin (1, 1·5, and 2%) [**37**, 389] were tested against mildew [*Plasmopara viticola*: **38**, 558]. Zineb was most effective at 0·5–2%. Both were non-toxic.

Henner (J.). **Zur Frage der Anwendungskonzentrationen von Spritzschwefelpräparaten für die Oidiumbekämpfung im österreichischen Weinbau.** [On the question of the application concentration of sulphur spray preparations for *Oidium* control in Austrian Vine growing.]—*Pflanzenarzt*, **12**, 4, pp. 40–41, 1959.

In recent years *Oidium* infection [*Uncinula necator*] has caused considerable losses in Austria, an important contributory cause being the use of sprays containing too low a S conc. It is emphasized that under Austrian conditions 0·2% is correct for preventive spraying, and 0·4–0·5% for strong attacks.

Stojanović (D.) & Kostić (B.). **Monilia fructigena (Aderh. et Rubl.) Honey na Groždju.** [*Sclerotinia fructigena* on Grapes.] — *Zasht. Bilja* (*Plant Prot., Beograd*), *1958*, 46, pp. 65–67, 1 pl., 1958. [Engl. summ. Received Aug. 1959.]

From the Inst. agric. Res., Kragujevac, *S. fructigena* on the grape vars. Afus-ali and Prokupac was recorded for the 1st time in Yugoslavia [cf. **34**, 20] in 1955; in 1957 Smederevka was also attacked. When fruits of Hamburg muscat, Smederevka, and Prokupac were inoculated with *S. fructigena* from grape and quince, the fungus developed rapidly, forming abundant spores, whereas *M.* [*S.*] *laxa* [cf. **37**, 541] from plum developed very slowly, with practically no spores, and caused cracking of the fruit.

Chiarappa (L.). **Wood decay of the Grapevine and its relationship with black measles disease.** — *Phytopathology*, **49**, 8, pp. 510–519, 7 fig., 1959. [40 ref.]

In California black measles [**31**, 590], which may cause 1–25% annual loss, occurs in 2 forms. The severe form, often found in May–June, is characterized by apical dieback of the shoots, shrivelling of the fruit, and dropping or bronzing and necrosis of the leaves. New growth often occurs from proximal axillary buds, masking early symptoms. The mild form develops throughout the season, but chiefly in July–Aug. Leaf symptoms include various types and degrees of chloro-is, with distortion, or sometimes metallic-bronze areas appear on otherwise green leaves; fruit symptoms, sometimes unilateral on a cluster, consist of dark, purple spots on the berries, accompanied in some vars. by a characteristic flavour. Fruit and leaf symptoms may occur independently, the degree of infection of the vine as a whole varies, and individual vines rarely show symptoms every year.

In this study at the Univ. Calif., Davis, the author reviews the literature concerning a similar disease in Europe known as 'folletage', 'apoplexy', or 'esca' [cf. **15**, 199], and notes that both are associated with wood decay in trunks and branches, though in Calif. if affected vines are cut back hard they will produce symptomless new growth. Of the several fungi isolated from decayed wood tissues only *Fomes igniarius* and *Cephalosporium* sp. were found to be primary pathogens. It is suggested that a wood decay ascribed in France to *Stereum necator* [**5**, 592] was in fact due to *F. igniarius*. *S. necator* is regarded by the author as a synonym of *S. hirsutum*, also found on diseased vines in Calif. but unable to produce typical rot in pathogenicity tests.

Annual Report of the Department of Agriculture, Uganda, for the year ended 31st December, 1958.—ii+75 pp., 8 fig., 1959. 5*s*.

On pp. 29–33 of this report [cf. **38**, 655] it is stated that to introduce resistant genes into the local maize vars. K 8 and Muratha [**37**, 6], 2 main sources of resistance to rust (*Puccinia polysora*) [**38**, 405] have been used, AFRO 24: SLP 20 4a (a Mexican var. from W. Africa) and AFRO 29: Colombia 2 (a white flint var. from Colombia). Triple crosses of AFRO 29 × Katumbuli × K 8 or Muratha have also been used. The 1st rust-resistant Muratha (× AFRO 24, followed by back-crossing to Muratha) averaged better yields than K 8 and Muratha bulks, but less than improved strs. of these vars. With the increased use of early-maturing vars., such as K 8 and the rust-resistant strs., which are more susceptible to leaf blight (*Helminthosporium turcicum*) [cf. **38**, 405] than the older Muratha type vars., this disease has become more important. During 1957, it was found that an application of zineb twice weekly increased yields, often by over 50%, though disease incidence was not much reduced. It is thought that the S component of zineb may perhaps have a nutritional effect, which is to be examined further. Trials in both 1957 and 1958 showed that mid-year plantings were most affected by blight.

In the heat-treatment trial on ratoon stunting virus disease of sugarcane the yield from treated setts (av. of 5 vars.) was approx. 28% greater than that from

untreated. Some vars. such as POJ 2725 and POJ 2878 are more affected by the disease than others; the yields of Uba and POJ 2961 are not markedly affected until the 2nd ratoon crop.

Finger millet [*Eleusine coracana*] blast (*Piricularia oryzae*) [but cf. **30**, 509] destroys > 10% of the heads in the Northern and Eastern Provinces. The Mozambique var. no. 359, poor, but of possible parental value, remained immune.

Beniowskia sphaerodea [**20**, 593; **33**, 141] was prevalent on *Pennisetum purpureum*. Maneb, captan, and thiram gave highly effective control of tomato leaf spot (*Septoria lycopersici*) [cf. **38**, 280].

On p. 38 it is stated that the brown lesions frequently seen on the leaves of Robusta coffee are caused by a *Colletotrichum*, probably *C. coffeanum* [*Glomerella cingulata*: cf. **38**, 518]; a similar fungus was isolated from berries.

Săvulescu (T.) & Săvulescu (Olga). **Tratat de patologie vegetală. Vol. I.** [Treatise on plant pathology. Vol. I.] –pp. 725, 142 fig., Bucureşti, Editura Academiei Republicii Populare Romîne.

This work, entirely in Romanian, deals first (in an introduction and 3 chapt.) with the general principles (309 pp.) of plant pathology, covering history, development and organization in Romania, parasitism, defence reactions and symptoms, resistance and immunity, and control methods; and then (in 5 chapt.) gives an annotated classification of syndromes and descriptions (all under host families) of virus diseases, bacterioses, and diseases caused by algae and myxomycetes *sensu stricto*. Each chapt. has its own bibliography. The diseases are for the most part illustrated by monochrome photoprints.

Bärner (J.). **Bibliographie der Pflanzenschutzliteratur 1952.** [Bibliography of plant protection literature 1952.] xli +433 pp., Berlin, Paul Parey, 1959. [Engl. and Fr. introd., contents, and page-headings.]

This instalment [cf. **38**, 121] comprises over 12,700 titles and is compiled on the usual lines. It completes the series 1914–52.

Gay (W. D.). **The relation of fungi to human affairs.**—xiii +510 pp., 191 fig., New York, Henry Holt & Co. Inc., 1959. $8.50.

This attractive book reviews current knowledge over the entire range of fungal activities, both beneficial and harmful, some two-thirds of the book being devoted to the former. Its appraisal of current techniques in industrial mycology particularly suit it as supplementary reading for courses in that field, and, in virtue of its broad scope and practical approach, it is likewise to be recommended as an introduction to most problems of applied fungal physiology. Up-to-date bibliographies follow the separate sections and there is a subject index.

Nelson (G. A.). **The persistence of Corynebacterium insidiosum in soil.**—Abs. in *Phytopathology*, **49**, 9, p. 547, 1959.

Conc. suspensions of *C. insidiosum* [**38**, 264, 385] were added to non-sterile soil at 120% field moisture capacity and stored at room temp. After 7 days no viable wilt bacteria were recovered, though in sterilized soil they persisted for 38 days under the same conditions. At lower moisture and temp. persistence in non-sterile soil was longer (over 12 days) but numbers were low.

Manigault (P.), Salmon (J.), & Rousseau (M.). **Étude comparée du tissu tumoral des plantes et du tissu normal par spectromicroscopie de fluorescence.** [A comparative study of tumoral and normal plant tissue by means of spectromicroscopic examination of fluorescence.]—*Bull. Microscop. appl.*, Sér. 2, **9**, 1, pp. 10–19, 2 pl., 3 fig., 2 diag., 1959.

A powerful mercury lamp with a blue filter was used in this study at the Inst.

Pasteur, Paris, of the modifications undergone by the conducting strands of the stem near the site of inoculation of *Pelargonium zonale*, *Datura metel*, and *Helianthus tuberosus* plants with *Agrobacterium tumefaciens*. The modifications observed are considered to be the 1st indication of tumour formation.

Hall (I. M.) & Half Hill (Jean C.). **The germination of resting spores of Entomophthora virulenta Hall and Dunn.**—*J. econ. Ent.*, **52**, 1, pp. 30–35, 2 fig., 1959.

The results of tests at the Univ. Calif. Citrus Exp. Sta., Riverside [cf. **39**, 3], demonstrated the germinability of 2–5% of the resting spores of *Entomophthora virulenta*, 1 of 5 spp. of Entomophthorales isolated from the spotted lucerne aphid *Therioaphis maculata* [**36**, 470], from pure cultures on removal from the dry state and transference to artificial media. The influence of chitin-splitting bacteria or a protracted period in a moist environment are not essential to germination, but it increases with prolonged soaking. Many spores germinated after 10-min. exposures to temp. up to 93° C. but no growth occurred after 96 hr. at 85°.

Hey (G. L.) & Marshall (K.). **The new chemicals.**—*Grower*, **51**, 21, p. 1122; 22, p. 1173; 23, pp. 1211, 1213, 1959.

This series of descriptive notes on fungicides and pesticides, giving their chemical nature and a brief account of their potentialities and application, deals with the fungicides captan, cyprex, glyodin, griseofulvin, karathane, maneb, pentachloronitrobenze, phaltan, phelam, tecnazene, thiram, ziram, and zineb, and the soil sterilizers mylone and sodium methyldithiocarbamate (vapam, sistan).

Wedding (R. T.) & Kendrick (J. B.). **Toxicity of N-methyl dithiocarbamate and methyl isothiocyanate to Rhizoctonia solani.**—*Phytopathology*, **49**, 9, pp. 557–561, 2 graphs, 1959.

At Univ. Calif., Riverside, the production of $C^{14}O_2$ from uniformly labelled glucose-C^{14} by *R.* [*Corticium*] *solani* was used to compare effects on glucose metabolism exerted by Na-N-methyl dithiocarbamate, methyl isothiocyanate, and elemental S. The 1st two inhibited this reaction, but by different modes of action; S had no effect. Loss of soluble cell constituents of *C. solani* during incubation with dithiocarbamate showed a pronounced increase in permeability of the mycelium as measured by loss of either dry wt. or P^{32} labelled cell constituents. Neither methyl isothiocyanate nor S had any effect in altering permeability. The toxic effects of dithiocarbamate on respiration and permeability were related to inhibition of subsequent growth of the mycelium. The evidence presented supports a hypothesis that at least part of the fungicidal effectiveness of dithiocarbamate derives from its reaction within living cell membranes at their outer surface eliminating their effectiveness in isolating the protoplast from its environment.

Horsfall (J. G.) & Rich (S.). **Antisporulant action of 2-(trichloropropyl) benzothiazole.**—Abs. in *Phytopathology*, **49**, 9, p. 541, 1959.

While several synthetic compounds, such as chelators and mitotic inhibitors, can prevent the differentiation of conidia of *Monilinia* [*Sclerotinia*] *fructicola*, Cu salts and α,β-unsaturated ketones enhance such differentiation. Recent studies have shown that 2-(γ,γ,γ-trichloropropyl) benzothiazole inhibits spore formation of *S. fructicola*, *Stemphylium sarciniforme*, *Aspergillus niger*, and *Botrytis cinerea* in culture, but not of *Penicillium* sp., and this inhibition is reversible by $CuSO_4$ and pulegone, an α, β-unsaturated ketone.

Hilborn (M. T.) & Farr (Wanda K.). **A biologically produced fungicide.**—Abs. in *Phytopathology*, **49**, 9, p. 541, 1959.

With the knowledge that chitin, a major constituent of the cell walls of *Aspergillus*

niger, may account for the resistance of this fungus to some fungicides, studies were made with chitinase, in expressed liquid from *Lycoperdon* spp. or the skins of almonds. Extracts from these sources caused partial disintegration of the conidial walls of *A. niger* and at 0·1 p.p.m. suppressed germination. The possible use of an enzyme as a fungicide is novel.

Orsenigo (M.). **Influenza di alcuni derivati dell' acido ditiocarbammico sulla biologia di diversi funghi.** [The influence of some derivatives of dithiocarbamic acid upon the biology of various fungi.]—*Ann. Fac. Agr.*, Ser. 6, **3** (*Pubbl. Univ. Sacro Cuore*, N.S., **69**, *1958*), pp. 148–189, 23 graphs, 1959. [Fr., Engl. summ.]

In a study at the Ist. Patologia Vegetale and Chimica Agraria, Milan, of the phenomena associated with the fungicidal activity of the derivatives of dithiocarbamic acid it was found that the reduction in sporulation and in the pigmentation of the spores and mycelium of *Aspergillus niger*, *Alternaria tenuis*, and *Macrosporium* [*Stemphylium*] *sarciniforme* [cf. above] induced by zineb was not caused by Zn, but by the ethylene group.

Diener (U. L.). **Control of southern blight of Tomato and Pepper in Alabama.**—Abs. in *J. Ala. Acad. Sci.*, **30**, 2, p. 5, 1958.

In experimental plots at 3 locations in 1953, 1954, and 1956, terraclor, applied either as a 20% dust mixed in the furrow at a rate of 720 lb. 100 gal. or as a setting water treatment at $\frac{1}{3}$ qt./plant, was significantly more effective against *Sclerotium rolfsii* on tomato [**39**, 50] and pimento [capsicum] than captan, dithane 20, Shell CBP, or Stauffer N521. The water treatment was more effectual and economical than the soil mix.

Darozhkin (N. A.). Вынікі фітапаталагічных даследаванняў у БССР. [Survey of phytopathological researches in Byelorussian S.S.R.]—Вес. Акад. Нав., Мінск [*Ves. Akad. Nav., Minsk*], Ser. Biol. Sci., *1958*, 1, pp. 55–61, 1958. [Received Nov. 1959.]

This is a brief historical survey starting from the establishment of phytopathological researches in 1913 in White Russia to the present day. Works on different diseases and hosts are mentioned, each with a short description and the names of the workers and dates, but there is no bibliography.

Proclamation No. 17 of 1959 (Mauritius). To control the importation of certain articles.—5 pp., 1959.

Previous legislation [cf. **20**, 480; **38**, 461] is revoked and the importation into Mauritius of sugar-cane is forbidden, as is that of grape vine from Japan and China, Rosaceae from S.E. and E. Africa, dahlia plants from S. and parts of S.E. Africa, potatoes from N. America and France, maize from any country where *Xanthomonas stewartii* [map 41] occurs, and sunflower (including seed) from S. America. Legislation to control importation otherwise is set out.

Santoro (T.) & Casida (L. E.). **Improved method for obtaining vegetative growth of mycorrhizal and other slow growing fungi.**—*J. Bact.*, **78**, 3, pp. 449–450, 1 fig., 1959.

Fungi which grow slowly *in vitro*, do not sporulate, and do not fragment during growth, have the disadvantage that when subinoculated they have relatively few growing points for development. *Boletus luteus*, *B. bicolor*, *Amanita rubescens*, *A. caesaria*, *A. muscaria*, and *Cenococcum graniforme* [*C. geophilum*], with this type of growth were used at the Dept Bact., State Univ. Pa, to develop a technique to increase growth. They were grown at 21° C. in 15 ml. Fries liquid medium in 6 oz.

flat bottles containing sufficient beads (6 mm., solid glass) to cover one side: the bottles were inoculated with the total growth on 7-day slants of the same medium, and then shaken vigorously and again 7 days later to fragment the mycelium. This mycelial suspension was transferred aseptically by pipette to 32 oz. bottles containing the medium of Melin and Das. After 7–12 days considerable aerial and submerged growth had developed which was further increased by shaking on the 4th or 5th day.

Schmitthenner (A. F.). **The effect of media concentration on sporangia production in Phytophthora.**—Abs. in *Phytopathology*, **49**, 9, p. 550, 1959.

Semisolid agar (2 g. l.) plus 5 serial 1:3 dilutions of extracts from 64 g./l. Lima beans [*Phaseolus lunatus*], maize, or ground lucerne, 200 ml. V-8 juice/l., and comparable dilutions of a standard sucrose-asparagine-thiamine medium, was used [cf. **39**, 8]. *Phytophthora parasitica* and *P. cactorum* formed sporangia over a wide range of dilutions of all nutrients; *P. sojae*, *P. cryptogea*, and *P. erythroseptica* produced abundantly only in the lower concs. of some nutrients, and *P. megasperma* only in the lowest. Sporangia formed on solid (20 g. agar/l.) lucerne extract with *P. parasitica* and *P. cactorum*, on flooded, solid cultures of *P. erythroseptica* and *P. cryptogea*, but only in semisolid cultures of *P. sojae* and *P. megasperma*. Sporangia occurred at a range of concs. wider than that suitable for production of zoospores.

Carmen (L. M.) & Lockwood (J. L.). **Factors affecting zoospore production by Aphanomyces euteiches.**—Abs. in *Phytopathology*, **49**, 9, p. 535, 1959.

When mycelial mats were grown at 20–28° C. on peptone broth [at Mich. agric. Exp. Sta.: **38**, 722], replacement of the medium with tap water, followed 1–2 hr. later by distilled water at 24°, induced zoospore formation within a further 6–8 hr. Mycelial dry wt. was max. in cultures at 28°. Bubbling air through the replacement water increased the number of zoospores 2–4 times (up to 1,000,000/ml.). Light had no effect. Sporulation was more profuse in 5- than in 3-day cultures but decreased in those over 5 days old.

Leach (C. M.). **Effects of visible and ultraviolet radiations on the sporulation of Ascochyta pisi and other seed-borne fungi.**—Abs. in *Phytopathology*, **49**, 9, p. 543, 1959.

When 40 isolates of *A. pisi* were cultured in darkness for 10 days, sporulation was nil to moderate; under daylight and fluorescent light it was profuse. Filtering fluorescent light showed that ultraviolet, but not visible radiation, stimulated formation of pycnidia, near ultraviolet (mainly 3650A) being stimulatory, though ultraviolet in the germicidal range (mainly 2537A) was lethal. Pycnidia formed only on mycelium active at the periphery at the time of irradiation and there was no evidence of movement of stimulus from irradiated to unirradiated young mycelium. Irradiated colonies on buffered media produced pycnidia at pH 4·6–8·6. *A. pisi* was detected more easily when infected seed of *Vicia villosa* was irradiated on media for 5 days. Sporulation of 8 other spp. of seed-borne fungi was stimulated over that in darkness by exposure to ultraviolet light.

Doguet (G.). **Action de températures élevées, voisines de la température léthale, sur les spores de deux champignons.** [Effect of high temperatures, near the thermal death-point, upon the spores of two fungi.]—*Bull. Soc. bot. Fr.*, **106**, 5–6, pp. 177–186, 4 fig., 1 graph, 1959. [8 ref.]

Germination of fresh, mature ascospores of *Chaetoceratostoma longirostre* and conidia of *Trichothecium roseum* maintained in distilled water at 22° C. took place in 7–10 hr., but when subjected first to temps. approaching lethal (50–60° and 49–53°, respectively) before testing germination on agar a dormancy was induced which was a function of the temp. and of the length of time they had been submitted to it. This thermo-dormancy reached 12–17 days with *C. longirostre*, being most marked

in spores from young cultures, and 32 days with *T. roseum* (longest in spores from old cultures). It was definitely prolonged by a return to 0° instead of to the opt. temp. From the results it would appear that for *T. roseum* a temp. below 47·5° and for *C. longirostre* one below 50° would induce thermo-dormancy but would not be lethal whatever its duration, whereas 55·2° for the former and 60·6° for the latter would kill the spores instantaneously.

Venkata Ram (C. S.). **Cellulolytic activity and fungal nutrition with special reference to decomposition of bacterial cellulose by Fusarium culmorum.**—*Phytopath. Z.*, **35**, 2, pp. 122–134, 1 fig., 3 graphs, 1959. [Germ. summ.]

In further studies at the Univ. Bot. Lab., Madras [cf. **37**, 23], uniform 9 cm. disks of bacterial cellulose (produced by *Acetobacter xylinium*) were used to investigate the influence of pH and nutritional factors on the cellulolytic activity of *F. culmorum*. No direct relation could be established between growth rate and decomposition of cellulose. Optima for decomposition of filter paper and bacterial cellulose were at the same level of pH (5) and N, P, K, and Mg conc., whereas lower concs. of these elements were required for growth. Nitrate N was superior to ammonium N and urea for growth/decomposition on either substrate. Opt. Zn conc. markedly stimulated cellulolytic activity on filter paper but not on bacterial cellulose, whereas the reverse occurred with B. Sucrose and glucose at 0·4 g.% increased decomposition of bacterial cellulose but not filter paper; the opposite applied to cellobiose. Higher concs. of the 3 sugars inhibited cellulolytic activity on both substrates.

Härri (E.). **Physiologische Untersuchungen über die Gattungen Thielavia Zopf und Thielaviopsis Went.** [Physiological studies on the genera *Thielavia* and *Thielaviopsis*.]—*Phytopath. Z.*, **36**, 1, pp. 27–66, 9 fig., 7 graphs, 1959. [Engl. summ. 95 ref.]

Investigation of 11 strains of *Thielavia* (2 spp.) [**36**, 426] and 7 of *Thielaviopsis* (2 spp.) at the Eidg. Techn. Hochschule, Zürich, established beyond doubt that there is no genetic connexion between the 2 genera and that *T. basicola* and *Thielavia basicola* are 2 different fungi. The opt. temp. range for growth of *Thielavia in vitro* is 33–42° C., and the most favourable initial pH 3·9–6, the same as that for *Thielaviopsis* [**35**, 642]. Light has no influence on the growth of *Thielavia*; it grows equally well on synthetic and natural media. Mono-, di-, tri-, and polysaccharides as well as various alcohols can be used as C sources. It can use N from nitrates, ammonium salts, and organic compounds, whereas *Thielaviopsis* needs mainly organic N. One strain of *Thielavia terricola* was found to produce a biologically inhibitory principle in its cultures, but no such principle was detected in cultures of *Thielaviopsis*. The different results obtained in various toxicity tests suggest the presence of more than 1 biologically active substance. In mixed cultures *Thielaviopsis* stimulated the formation of perithecia by *Thielavia*. Attempts to infect tobacco were negative with *T. terricola* and positive with *Thielaviopsis* sp. There was no difference in the damage caused by the latter alone and a mixture of the 2 fungi.

Goodman (R. N.). **The uptake of streptomycin by intact leaves and leaf tissue as influenced by time, temperature, light and cation competition.**—Abs. in *Phytopathology*, **49**, 9, p. 539, 1959.

Uptake of streptomycin by excised leaves of apple, pepper [*Capsicum* sp.], bean, and coleus floated in 0·5% water agar + antibiotic was assayed microbiologically. A 48 hr. contact with the agar gave double the absorption of 24 hr., and at 10, 28, and 37° C. absorption rose with temp. Light generally favoured absorption. Adsorption of streptomycin by leaf tissue homogenates was limited by the presence of inorganic cations, particularly Ca^{++} and Mn^{++}.

Pestinskaya (Mme T. V.). Изменение антагонистических свойств грибов под влиянием температуры. [Change in the antagonistic properties of fungi under the influence of temperature.] —*Bot. Zh. S.S.S.R.*, **44**, 7, pp. 1007–1009, 1959.

In experiments at the All-Union Res. Inst. for Plant Protection, Leningrad, the opt. temp. for growth of *Fusarium arenaceum* var. *herbarum* was 20–21° [C.] and the critical temp. 29–30°. At 20–21° there was intensive pigmentation and abundant sporulation; at 25–26°, though the diam. of the colony was the same, pigmentation was weak. No development occurred at 6–6·5 or 31–32°. For *Trichoderma lignorum* [*T. viride*] and *Alternaria tenuis* max. growth rate, intensive pigmentation, and copious sporulation took place at 25–26° (min. 6–6·5°). They grew fairly well at 31–32°, the highest temp. used in the experiment.

F. a. var. *herbarum* was used to test the significance of temp. in the change in antagonistic properties, with *A. tenuis* and *T. viride* for contrasts. *F. a.* var. *herbarum* caused pronounced fungistasis in both fungi at 29–30° and to *T. viride* also at 12–13°, and some antagonism to *A. tenuis* at 20–21° though weakly at 12–13°; antagonism to *T. viride* was weak at 20–21°. The change of a single temp. factor caused considerable divergence of the relationships. This may be expressed in change of degree of some type of antagonism or the transition of one type of antagonism to another. *F. a.* var. *herbarum* can be highly antagonistic to the other 2 fungi at a temp. unfavourable to its growth and development.

Kahn (R. P.). **Inhibition of Pythium butleri and P. ultimum colony size by an agent extracted from Sphagnum moss.**

Kahn (R. P.) & Silber (G.). **Movement of four soil-borne pathogens in sterile soil and Sphagnum moss.** Abs. in *Phytopathology*, **49**, 9, p. 542, 1959.

When the fungi were cultured on wheat seeds for 6–10 days and the seeds transferred singly to Petri dishes with 40 ml. sphagnum extract, growth after 10 days at 20–21° C. was 5–10 times less than in distilled water. The inhibitory agent was stable below 50°, unstable after 10 min. at 55–100°, longevity was > 30 days at 4 and 20°, and the dilution end-point > 1:250,000.

The 2nd abstract notes the retardation of spread of the same 2 fungi, and also *Rhizoctonia* [*Corticium*] *solani* and *Phytophthora parasitica* var. *nicotianae*, in a sphagnum planting medium as compared with sterile soil, the criterion being the death of cucumber, kenaf (*Hibiscus cannabinus*), or tobacco seedlings planted at various distances from the source of inoculum. *P. p.* var. *nicotianae* grew 21 in. in soil but only 5 in. in moss after 50 days at 85–95° F. The damping-off fungi, grown with seedlings 1 month old, had advanced 15–19 in. in soil but only 2 in. in moss.

Nadakuvukaren (M. J.) & Horner (C. E.). **An alcohol agar medium selective for determining Verticillium microsclerotia in soil.** *Phytopathology*, **49**, 8, pp. 527–528, 1 fig., 1959.

At Ore. State Coll., Corvallis, the following technique proved more satisfactory than that of Wilhelm [**29**, 540] or Maloy *et al.* [**37**, 523] for determining *V. alboatrum* in soil. Water agar with 100 p.p.m. streptomycin is autoclaved in flasks containing 90 ml., cooled, and held at 42–44° C. Just before diluted soil samples are mixed with the agar 0·5 ml. absolute alcohol is added to each flask; plates are poured and incubated for 10 days at 18–23° in the dark. On this medium *Verticillium* colonies form abundant microsclerotia in 7–10 days, in strong contrast to other fungi against a white background. The plates may be held for several weeks at room temp. before examination if necessary.

Rȳbalkina (Mme A. V.) & Kononenko (E. V.). Микрофлора разлагающихся растительных остатков. [Microflora of decomposing plant residues.]—Почвоведение [*Pochvovedenie*], *1959*, 5, pp. 21–34, 12 fig., 1959. [Engl. summ.]

At the Dokuchaev Soil Inst., Moscow, plant residues from W. Kazakhstan comprising a grass mixture (mostly brome grass [*Bromus* sp.]), sainfoin [*Onobrychis*] residues from virgin soil, and residues of several spp. of saltwort [*Salsola* sp.], were kept in sacks of glass textile in pots of soil for 2 yr. For controls bags of soil were used. All were in the dark at 20–25° [C.] during the summer and 18–20° during the rest of the yr. The microflora [cf. **38**, 309] was studied on different nutritive media. In the grass and virgin soil residues bacteria were predominant in the 1st 2–3 weeks; the number of fungi was much smaller in these 2 than in saltwort residues. In the virgin soil residues 2 *Fusarium* spp. were predominant, *Mucor*, *Trichoderma*, and *Stemphylium* being few; in grass residues *Rhizopus nigricans* [*R. stolonifer*] was by far the most common. A *Penicillium* sp. was most abundant in saltwort residues. In the control soil the numbers of bacteria and fungi were very low. In the early stages of decomposition there were primarily non-spore-forming bacteria, yeasts, and fungi, followed by spore-forming bacteria and actinomycetes. The complex of micro-organisms in the grass and virgin soil residues was similar, differing greatly from the saltwort.

Maublanc (A.) & Viennot-Bourgin (G.). **Champignons de France. Tome I: Texte général. II: Atlas.** [Fungi of France. Vol. I: General text. II: Plates.] —iv+305 pp., Portrait, 59 fig.; 283 pp., 224 pl. (221 col.), 5th Edition, Paris, Paul Lechevalier, 1959. 5,500 Fr. (2 vols.).

This well-known work has been revised and brought up to date by G. Viennot-Bourgin. Its main purpose is to assist identification, and the aim of M. Maublanc was to be 'rational, logical, and as natural as possible', taking into account leading modern treatises on the subject, yet respecting 19th century views on systematics.

The 1st vol. deals with general ideas on fungi (pp. 1–26): classification (pp. 27–62); classification of the Basidiomycetes (pp. 63–80): homobasidial Basidiomycetes (pp. 81–199); Ascomycetes (pp. 201–221): and edible and poisonous fungi (pp. 223–254). There are keys to the principal genera (pp. 255–280), definitions of the terms used (pp. 281–296), a list of abbreviations of authors' names (pp. 297–298), and a general bibliography (pp. 299–305).

The 2nd volume contains 221 excellent coloured plates from water colours by Mlle J. Boully, F. Porchet, and A. Bertaux, each with notes on the synonymy, common names, characteristics, habitat, edibility, etc. There are indexes of Latin names and of German, English, Italian, and Spanish names of fungi.

Minz (G.) & Solel (Z.). **New records of field crop diseases in Israel.** -*Plant Dis. Reptr*, **43**, 9, p. 1051, 1959.

Reported from the agric. Res. Sta., Rehovot-Beit Dagan, Israel are: *Stemphylium sarciniforme* [map 139] and *Cercospora zebrina* on clover (*Trifolium alexandrinum*) together with *Dothidella trifolii* [**21**, 99, 527], also found on *T. resupinatum*; *Pseudoplea trifolii* on lucerne; *Erysiphe polygoni* on broad bean; *Cercosporina* sp. and *Ascochyta* sp. on *Trigonella foenum-graecum*; *Alternaria macrospora* on sesame; and *Urocystis tritici* [*U. agropyri*: map 80; **23**, 336] on wheat.

Tomilin (B. A.). Ржавчинные грибы **(Uredinales)** Курской области. [Rust fungi (Uredinales) from the Kursk region.]—*Bot. Zh. S.S.S.R.*, **44**, 7, pp. 1010–1014, 1959.

This study from the V. L. Komarov bot. Inst., Leningrad, is based on materials collected by the author in 1954–5, supplemented by herbarium materials and data

from published monographs. So far 132 spp. (15 gen.) have been found in the area. They are grouped on the geographical basis of Săvulescu [**35**, 398]. Polar spp. are most richly represented in the region. Three spp. are new for the area.

YERKES (W. D.) & SHAW (C. G.). **Taxonomy of the Peronospora species on Cruciferae and Chenopodiaceae.** - *Phytopathology*, **49**, 8, pp. 499-507, 1959. [54 ref.]

Previous taxonomic treatments of the Peronosporaceae, in particular Gäumann's [**3**, 241], are reviewed, and conidial measurements from large numbers of collections of *Peronospora* on Cruciferae (11 gen.) and Chenopodiaceae (3 gen.) are tabulated. Within the *Peronospora* complexes on these 2 families oospores were remarkably uniform in structure, but variations in conidiophore structure and conidial measurements, in both single specimens of crucifers and in series of specimens of 1 host in either family, were considerable. Neither morphology nor physiologic specialization alone is considered a suitable basis for species delimitation in this group, but rather the latter in conjunction with, but subordinate to, the former. One sp., *P. parasitica*, is recognized for the Cruciferae, and one, *P. farinosa* [*P. effusa*], for Chenopodiaceae; synonymy of these is listed.

GUSTAVSSON (A.). **Studies on nordic Peronosporas. I. Taxonomic revision. II. General account.**—*Bot. Notiser. Op. bot.*, **3**, 1, pp. 1–271, 28 graphs; 2, pp. 1–61, 3 graphs, 1959. [18 pp. ref.; 6 pp. ref.]

The first paper gives descriptions of the known spp. of *Peronospora* in Scandinavia and Finland on 30 host families, with some synonymy and the known distribution. Several new spp. are described. The nomenclature, descriptions, and identifications of Gäumann [cf. above] are reviewed and corrected where necessary, but the pattern of speciation here followed is similar to that of Gäumann though the results of his biometric studies are not always accepted.

The general account, after a brief historical survey, discusses ecology, distribution, biometry, and the species problem. The author accepts obvious morphological differences in oospores or conidiophores as specific characters, and adds to these 'distinct biometric differences' in the conidia not caused by natural variation or aberration.

NELSON (R. R.). **Interspecific crosses as a means of studying evolution of sexuality and pathogenicity in the genus Helminthosporium.** Abs. in *Phytopathology*, **49**, 9, p. 547, 1959.

Crosses of monoconidial isolates of *Cochliobolus heterostrophus* × *C. miyabeanus*, × *H. sorghicola*, and × *H.* sp. (pathogenic to rice) produced sparse perithecia with numerous asci, though ascospores were but few and mostly did not germinate. Some of the ascospore isolates were cross-fertile with one or other parent, others with neither. Inoculations showed some isolates to be pathogenically similar to 1 parent, others to both. Apparently related fungus spp. have genes in common for sexuality and pathogenicity [**37**, 281].

JOLY (P.). **Variations morphologiques et notion d'espèce chez le genre Alternaria (Nees) Wiltshire.** [Morphological variations and the idea of species in the genus *Alternaria*.] *Bull. Soc. mycol. Fr.*, **75**, 2, pp. 149–158, 2 fig., 1959.

In culture, morphological variations in *Alternaria* occur only in Neergaard's [**25**, 579] sections 1 and 2, i.e. Longi- and Brevi-catenata, since the other species produce hardly more than a sterile mycelium. The chain-producing spp. are distinguishable in nature and in the 1st culture after isolation by the size of the spores and the manner of septation, but subsequently the specific characters rapidly become indistinguishable and a distinct morphological convergence towards *A. tenuis*, as ordinarily understood today, takes place, rendering the precise determination of

old, fertile cultures difficult, often impossible. Morphological convergence may also occur in nature. There is a continuous series of morphological modifications running parallel to an increasing change from saprophytism to parasitism.

A. brassicicola, however, does not fit into this framework. It produces long chains of small spores with simple septation, but it is quite distinct from 'the morphological type' *A. tenuis*: it has a higher degree of parasitic ability than most of the Brevi-catenata; it sporulates indefinitely in pure culture without converging towards *A. tenuis*; and longitudinal septa are almost completely absent. This last fact should suffice to remove it from *Alternaria* entirely. *A. resedae* Neerg. is probably in the same category as *A. brassicicola*.

With this reservation, the genus *Alternaria* appears to be in active process of morphological and biological evolution. Neergaard's sections represent only morphological forms which a single sp. can take.

Krassilnikov (N. A.). **La classification des actinomycètes par la méthode de la variation expérimentale.** [The classification of actinomycetes by the method of experimental variation.]—*Ann. Inst. Pasteur*, **96**, pp. 434–447, 1959. [Engl. summ.]

From studies at the Inst. Microbiol., Acad. Sci., Moscow, the author concludes that antibiotic production is a good taxonomic character for actinomycetes [cf. **38**, 497].

The International Bibliography of Electron Microscopy. I, 1950–1955.—vii + 166 pp., New York, 21, New York Society of Electron Microscopists, 1959. [*Biol. Abstr.*, **33**, 12, p. 3628, 1959.]

In this bibliography of the world literature on electron microscopy an attempt is made to include all papers that report or review original research with or upon the electron microscope. Electron diffraction is excluded, except for papers reporting instrumentation adapting the electron microscope for such studies, and for studies employing parallel diffraction and microscopic examination of specimens. Papers on other types of microscopy not functioning with visible or ultra-violet are included.

Uschdraweit (H. A.) & Valentin (H.). **Untersuchungen über Kultur- und Wildstauden als Zwischenwirte für wirtschaftlich wichtige Viren.** [Studies on cultivated and wild perennials as intermediate hosts for economically important viruses.]—*NachrBl. dtsch. PflSchDienst (Braunschweig)*, *Stuttgart*, **11**, 6, pp. 89–92, 1959. [Engl. summ.]

At the Institut für Gärtnerische Virusforschung, Berlin-Dahlem, tests of 6,000 plant specimens (72 families), mainly perennials, for virus infection on a range of indicators, showed 283 spp. to be infected. Cucumber mosaic virus [**35**, 743; **38**, 678] was determined in $\frac{2}{3}$ of the infected plants (173 spp.). A 'virus of hardy primroses', not yet described, occurred in 96 spp., particularly Caryophyllaceae, Compositae, Labiatae, Polemoniaceae, and Primulaceae, symptoms being almost exclusively masked. In mixed infection with other viruses it enhanced their symptoms and further depressed growth. Up to 25% of the infected ornamentals contained tobacco 'mauche' virus [loc. cit.], for which so far there are 32 host spp. Ring spot viruses and a turnip and swede mosaic virus [turnip mosaic virus: **38**, 679] were responsible for under 10% of the total infection.

Infected plants usually survive the winter without damage. Many symptomless perennial ornamentals are a potential reservoir of infection for other cultivated plants. Wild perennials are infected to a lesser degree than cultivated plants.

Hein (Alice). **Beiträge zur Kenntnis der Viruskrankheiten an Unkräutern. IV. Stachys palustris, ein Wirt des Gurkenmosaikvirus.** [Contributions to the

knowledge of the virus diseases of weeds. IV. *S. palustris*, a host of the Cucumber mosaic virus.]—*Phytopath. Z.*, **35**, 2, pp. 119–121, 2 fig., 1959.

In further studies [cf. **36**, 749] the author detected cucumber mosaic virus in *S. palustris* in Germany, a hitherto unrecorded host, and transmitted it to *S. lanata*. The chief symptom was veinbanding.

Wetter (C.), Quantz (L.), & Brandes (J.). **Verwandtschaft zwischen dem Stauchevirus der Erbse und dem Rotkleeadernmosaik-Virus (Red Clover vein mosaic virus).** [Relationship between Pea stunt virus and Red Clover vein mosaic virus.] *Phytopath. Z.*, **35**, 2, pp. 201–204, 1 graph, 1959. [Engl. summ.]

Serological studies at the Inst. für landwirtschaftliche Virusforschung, Brunswick, suggested that the German pea stunt virus is closely related to red clover vein mosaic virus [cf. **38**, 503]. Both have rods about 655 × 12–13 mμ diam. The virus also appears to be related to pea streak virus [**38**, 173].

Brandes (J.). **Elektronenmikroskopische Größenbestimmung von acht stäbchen- und fadenförmigen Pflanzenviren.** [Electronmicroscope measurement of 8 rod- and filamentous-shaped plant viruses.] *Phytopath. Z.*, **35**, 2, pp. 205–210, 1 pl., 2 graphs, 1959.

The dimensions (in mμ), measured at the Institut für landwirtschaftliche Virusforschung, Brunswick [cf. **37**, 244; **38**, 74], were: barley stripe mosaic 126 × 20, cowpea virus from *Phaseolus vulgaris* 305 × 15, wheat streak mosaic 702 × 12–13, tobacco etch 725 × 12–13, henbane mosaic (from tobacco) 724 × 12–13, lettuce mosaic 747 × 12–13, cocksfoot streak 752 × 12–13, and sorghum red stripe 750 × 12–13. Previous results of other workers are noted.

Miličić (D.), Panjan (M.), Bilanović (D.), & Katić (B.). **Viruskrankheit von Alliaria officinalis.** [Virus disease of *A. officinalis*.]—*Acta. bot. croat.*, **17**, pp. 159–176, 2 pl., 8 fig., 1958. [Serbo-Croat summ. Received Oct. 1959.]

Further studies by the Zagreb Inst. for Plant Protection [cf. **37**, 69] indicate that this mosaic disease is spreading to other regions, e.g. Croatia and Austria; it appears regularly in the Zagreb region. The virus also naturally infects *Hesperis matronalis* and *H. dinarica* and was sap-transmitted to these and to *A. officinalis*, *Nicotiana glutinosa*, *Sinapis alba*, *S. arvensis*, and *Capsella bursa-pastoris*.

The 1st symptoms appear on young leaves. On all infected plants chlorotic spots develop on the leaf blades; a marginal leaf roll, usually downwards, is often noticed, particularly on *Alliaria* and *Sinapis* spp. On *H. matronalis* the virus causes necrosis mainly of the lower epidermis of the lamina and of the petiole, penetrating the latter to kill the xylem parenchyma.

Holmes (F. O.). **Mechanical transmission of Potato-mottle virus to and from Citrus plants.**—Abs. in *Phytopathology*, **49**, 8, p. 524, 1959.

Potato mottle virus [potato virus X str.] was transmitted with difficulty to seedlings of Mediterranean sweet orange, Orlando tangelo, and Meyer lemon by abrasion with carborundum, but recovered easily by subinoculation to tobacco from the chlorotic lesions on the citrus leaves, though not from the green areas. This suggests that earlier failures in mechanical transmission of citrus viruses may have been due to use of insusceptible or insufficiently susceptible test plants rather than to an inhibitor in the citrus trees.

Hampton (R. E.) & Fulton (R. W.). **Factors responsible for the instability of some labile plant viruses.**—Abs. in *Phytopathology*, **49**, 9, p. 540, 1959.

Addition of 0·01 M of the polyphenolase inhibitors Na diethyldithiocarbamate, NaCN, *p*-nitrophenol, salicylaldoxime, or phenylthiourea markedly increased the

stability of *Prunus* viruses in cucumber extracts and tobacco streak virus in tobacco extracts, also that of *Prunus* virus B [**39**, 94] in squash extracts with reducing agents added. Partially purified stable extracts of virus B were made uninfective by incubation for 4 hr. with 0·01 mg./ml. purified polyphenol oxidase, during which time controls lost no infectivity. Oxidized polyphenols (*o*-quinones) also decreased infectivity of this virus, but not polyphenols in reduced form. Polyphenol oxidase activity was greater in tissue infected with *Prunus* viruses A and B than in healthy tissue. Instability of the viruses *in vitro* was apparently due to the action of polyphenol oxidase forming oxidized polyphenols after homogenization; inhibition of the enzyme either by sequestering the Cu or adding competitive substrates rendered the virus fairly stable.

Popow (G.) & Buchli (H.). **Kurze Beschreibung der Sommerweizen-, Sommergersten- und Hafersorten des schweizerischen Richtsortimentes 1959.** [Brief description of varieties of spring Wheat, spring Barley and Oats in the 1959 official Swiss list.]—*Mitt. schweiz. Landw.*, **7**, 5, pp. 74–80, 3 fig., 1959.

The notes on these 18 vars. include their reactions to diseases.

Premier colloque européen sur la rouille noire des céréales (Puccinia graminis). Notes diverses. [First European symposium on stem rust of cereals (*P. graminis*). Miscellaneous notes.]—Versailles (France). October 1958. [Mimeographed. Received Oct. 1959.]

This collection (in a folder) includes 18 papers read at the symposium held at Versailles in 1958 following a decision of the Fourth International Congress for the Control of Plant Diseases, Hamburg, 1957. Thirty representatives from Europe, Israel, and Morocco took part.

R. Chevalier & M. Massenot (Montpellier and Grignon, France) described the epidemic outbreak which occurred on wheat in France in 1958 [cf. **37**, 404]. Of little account in S. France, in N. central and E. France av. losses were 5%. No highly virulent physiologic races were present.

A. Dionigi (Stazione Agraria Sperimentale, Bari, Italy) reported on factors affecting the spread and perpetuation of outbreaks, including wind, temperature, and the 'receptivity' of the host.

G. Malençon (Rabat, Morocco) presented some preliminary data on the epidemiology of stem rust of cereals in Morocco [cf. **37**, 152]. Seasonal and regional climatic variation, and the presence of *Berberis hispanica* at 1,900–2,200 m. and of wild grasses and casually persistent cereals near the coast are among the factors involved.

L. Ogilvie & I. G. Thorpe (Min. Agric., England) [English text], discussing the occurrence of *P. graminis* on wheat in Great Britain from 1947–58 [**39**, 71], noted that in S. England *P. g. tritici* has not been found on barberry in recent years, though var. *avenae* has, and less frequently var. *secalis*. Records associate epidemics of *P. graminis* in S. England with high R.H. and temps. in June–July and movements of air masses from N. Spain and Portugal due to atmospheric depressions in the Bay of Biscay.

J. Overlaet (Louvain, Belgium) described epidemiological studies and an investigation of varietal resistance in Belgium where the disease usually appears rather late, as the inoculum is wind-borne from the S. Most of the wheat vars. cultivated are susceptible, but early-maturing autumn vars. may escape infection.

J. C. Santiago & J. Salazar (Elvas, Portugal, and Madrid) discussed the outbreak of *P. graminis* in Portugal [**38**, 196] and Spain in 1958. In much of the N.W. of the Peninsula plants still green in Sept. suffered severely from attacks by uredospores, but little from teleutospores.

J. C. Santiago [English text] discussed European collaboration in research on

stem rust epidemiology [**36**, 521]. M. J. Urries (Madrid) dealt briefly with collections of Uredinales in the uredo state on Gramineae in Spain in winter. Rita Basile (Rome) [Italian text] covered the physiological races of *P. g. tritici* isolated from barberry (*Berberis vulgaris* and *B. aetnensis*) in Italy in 1956–7 and 1958 [**37**, 223].

L. Guyot (Grignon) presented a fully tabulated account of studies of the role of wild Gramineae in the epidemiology of black rust of cereals in Europe and N. Africa [**37**, 403], also listing the wild grasses recognized as possible hosts (natural or experimental) of *P. graminis* and those on which the specialized forms (*tritici*, *avenae*, or *secalis*) were identified experimentally.

L. Guyot, G. Malençon, & M. Massenot noted the part played by *Berberis* spp. in epidemiology in France, Spain, and Morocco, with a table of the special forms isolated from barberry plants in the southern French Alps in 1956. M. J. Urries briefly described the part played by *Berberis* spp. in epidemiology in Spain.

R. C. F. Macer (Plant Breeding Inst., Cambridge) [English text] dealt with the physiologic specialization of *P. g. tritici* in the United Kingdom. Races 17, 21, and 40 occur in England [**39**, 71], 21 being the most frequently isolated from 1955–58. No wheat vars. resistant to black stem rust are at present grown in the U.K.

M. Massenot reviewed available information on the physiologic races of Europe and the Mediterranean countries. C. Sibilia (Rome) [Italian text] reported on the variations noted in the numbers of the most important physiologic races in Italy [**38**, 252] in different years and on the resistance of certain wheat vars. grown there to inoculation with mixtures of races.

R. Bouchet (Versailles) briefly described methods of assessing the intensity and duration of dew deposits on plants [cf. **34**, 309; **36**, 704; **37**, 268]. J. M. Hirst (Rothamsted exp. Sta.) [English text], described methods for trapping uredospores of *P. graminis*, with a table showing the characteristics of 12 different spore traps [cf. **37**, 10, 79]. A. Vincent (Versailles) dealt with the reaction of wheat vars. to *P. g. tritici* and the development of resistant vars.

A résumé of the decisions taken is given in French (by F. Kobel) and English (by J. C. Zadoks). [Synopses of the Symposium by L. Guyot appear in *Robigo, 1959*, 8, pp. 13–17, 1959, and *C.R. Acad. Agric. Fr.*, **45**, 8, pp. 387–388, 1959.]

Silverman (W.). **The uptake of vital dyes by the mycelium of Wheat stem rust in situ.**—*Phytopathology*, **49**, 8, pp. 531–532, 1959.

At Univ. Minn., St. Paul, epidermis covering developing uredia of race 38 of *Puccinia graminis* on Marquis wheat was stripped off and a drop of methylene blue (1:1,000 aqueous) or neutral red (0·5% aqueous made slightly alkaline with KOH) placed for a few sec. over the rust-bearing parenchyma and then washed off.

The contrast between the staining of old and young mycelium was similar to that obtained on fixed material with Flemming's triple with a fast green counter stain. There was rapid absorption of the dye by hyphal tips, younger haustoria, and haustorium mother cells, whereas older portions of the mycelium stained more slowly and less deeply. The results indicate that absorption of water-soluble dyes, and therefore possibly of water-soluble metabolites, is chiefly in that portion of the mycelium in the periphery of the lesion, where the necrotic ring forms around an inner green island, characteristic of infection type 2 [cf. **24**, 272].

Kingsolver (C. H.), Schmitt (C. G.), Peet (C. E.), & Bromfield (K. R.). **Epidemiology of stem rust : II. (Relation of quantity of inoculum and growth stage of Wheat and Rye at infection to yield reduction by stem rust).** *Plant Dis. Reptr*, **43**, 8, pp. 855–862, 1 fig., 1 graph, 1959.

Further studies at Fort Detrick [cf. **38**, 588] in which wheat (jointing) and rye (heading) plots were dusted on 20 and 22 Apr. with 0, 0·1, 1, 10, or 100 g. spores of

Puccinia graminis/acre in talc, gave a graded series of initial infections and reduced yield of wheat from 42 bush./acre in the uninoculated to 0·9 where rust had attained 1% severity (10 pustules/culm) by the early boot stage. When this severity was attained later, at early heading, late heading, milk, or grain development, losses were progressively less. Because of the earlier maturation of rye, losses, though following the same pattern, were proportionately less severe.

Kavanagh (T.). **A technique for seedling inoculation with chlamydospores of Ustilago nuda and U. tritici. The effect of temperature on the development of loose smut in adult plants of Wheat and Barley.**—Abs. in *Phytopathology*, **49**, 9, pp. 542–543, 543, 1959.

Seed was germinated on water agar or moist paper towelling at room temp. When the coleoptiles were about 1 cm. long the tips were cut off and the seedlings immersed in a suspension of 1 g. chlamydospores l. distilled water—wetting agent and placed under vacuum at 27 in. Hg, which was suddenly released after 2 min. The seedlings were then planted in autoclaved soil in the greenhouse at about 65° F.; barley showed a max. infection of 73% (*U. nuda*), wheat, in more limited trials, up to 31% (*U. tritici*) [*U. nuda*]. The method considerably shortens the interval between inoculation and spore production.

Seed of 3 vars. each of wheat and barley, from plants inoculated in the field in 1958, was sown in greenhouses held at min. temps. of 65, 75, and 85° F. At 85° infected wheat was severely stunted (¾ normal height) and smut sori were much reduced. Infected barley at 85° produced slender heads, with small to no sori but blasted; the flag leaves of many barley plants bore chlorotic streaks reminiscent of early symptoms of barley stripe [? *Helminthosporium gramineum*]. At 65 and 75° 'normal' smutted plants of both cereals were produced.

Ponchet (J.). **Caractères déterminatifs de la septoriose et de la fusariose du Blé.** [Determinative characters of *Septoria* and *Fusarium* infection of Wheat.]—*C. R. Acad. Agric. Fr.*, **45**, 12, pp. 631–633, 1959.

A description (with a table of symptoms) from the Sta. centrale de Pathologie végétale, I.N.R.A., Versailles, of the early stages of infection by *S. nodorum* and *F. nivale* [*Calonectria nivalis*: **38**, 126] on wheat, both seed-borne.

Jamalainen (E. A.). **The effect of seed dressing of winter cereals on low-temperature parasitic fungi.** *Maataloust. Aikakausk.*, **30**, pp. 200–201, 1958.

Further studies at Tikkurila [cf. **38**, p. 683] indicated that a trace of Hg with the seed in the soil gives considerable protection. During 1928–50 Hg treatment resulted in an av. 19·4% increase in the seed yield of autumn sown winter rye (131 tests) and 6·1% of winter wheat (35 tests), chiefly from control of *Fusarium nivale* [*Calonectria nivalis*]. In 1955–6 methoxyethylmercury chloride gave 140% increase in yield of winter rye, and only 10% damage by *C. nivalis* in the spring compared with 50% in the untreated plots. The dressing, containing 1·5% Hg, was applied at 500 g./ha. seed sown (7·5 g. Hg/ha.). In other tests in which *C. nivalis* in wheat and rye was practically eliminated phenyl mercury acetate and salicyl mercury acetate were equally effective, the various formulations giving 75–470 g. Hg/ha.

Moseman (J. G.). **Strain dynamics of powdery mildew of Barley, Erysiphe graminis f.sp. hordei, in North America.**—*Plant Dis. Reptr*, **43**, 9, pp. 1004–1009, 1959.

Studies at the U.S. Dept Agric., Beltsville, Md, resulted in isolation from cleistothecia on plants grown in Canada (B.C., Ont.) and in N.E. U.S.A., of new pathogenic strains of *E. graminis* [**38**, 474]. The cultures from B.C. were all classified as physiologic race 3, and were similar in pathogenicity to race 3 previously isolated

there except that they attacked Rabat (C.I. 4979), Algerian (C.I. 1179), and Marocaine 079 (C.I. 8334), which had previously been immune or highly resistant. The cultures from the U.S.A. and Ont. were pathogenically similar to the predominant races 8 and 9 except for their pathogenicity to Modia (C.I. 2483), Ricardo (C.I. 6306), Goldfoil (C.I. 928), and Stephan (C.I. 8051). As Goldfoil is 1 of the 6 standard differentials, this reaction characterized 1 of the cultures as pathogenically different from those previously isolated in N. America; it was designated race 21. There is some evidence that the same gene may condition the reactions of Goldfoil and Stephan, the 2 vars. giving the same reaction when inoculated with cultures of several races of the fungus [**35**, 760]; it was established also that those genes conditioning this reaction are not linked with the genes Ml_p, Ml_k, Ml_h, and ml_d [loc.cit.].

Moseman (J. G.). **Host pathogen interaction of the genes for resistance in Hordeum vulgare and for pathogenicity in Erysiphe graminis f.sp. hordei.**—*Phytopathology*, **49**, 8, pp. 469–472, 1959.

Further studies [cf. above] showed that for the genes Ml_g and Ml_k, which condition resistance to *E. graminis* in Goldfoil and Kwan (C.I. 1016) barley, complementary genes for virulence (V_g and V_k, respectively) occurred in culture CAN 12 of race 12 of the pathogen [**38**, 319]. Pathogenicity tests with the progeny of a cross between culture 21·1 of race 9, avirulent on these 2 barleys, and CAN 12 showed that V_g and V_k are inherited independently.

Schein (R. D.). **Resistance to Rhynchosporium secalis in the Barley world collection.**—Abs. in *Phytopathology*, **49**, 9, pp. 549–550, 1959.

The whole collection (991 lines) was screened in the field against natural infection by race US-1 (Penn.) and 52 of 74 lines resistant or immune were tested in the greenhouse for resistance to US-4 (Calif.). Of the 14 lines finally tested against 7 races of *R. secalis* [**38**, 140] from different States, 3 (C.I. 3515 (Spain), C.I. 8256 (Turkey), and C.I. 8286, Gembloux-14 (France)) were resistant to all, and 3 resistant to all but 1 (C.I. 7528, Vina, susceptible to US-4; C.I. 7283, Lignee-14, to US-6; and C.I. 8251, to US-1). All these were only partially winter-hardy.

Timian (R. G.). **Viability and pathogenicity of stored Helminthosporium sorokinianum conidia.**—*Plant Dis. Reptr.* **43**, 10, pp. 1105–1107, 1959.

Of the methods tested at the N. Dakota agric. Exp. Sta., Fargo, storage of conidia of *H. sativum* [*Cochliobolus sativus*] over $CaCl_2$ in a stoppered tube, lyophilizing, and mixing conidia with talc (1:100) were equally effective, preservation for up to 42 months at 4° C. under these conditions, without significant decrease in viability or pathogenicity to barley, being possible.

Banttari (E. E.) & Moore (M. B.). **The cause and transmission of blue dwarf of Oats and of 2 kinds of dwarfing in Barley.** Abs. in *Phytopathology*, **49**, 9, p. 533, 1959.

Oat blue dwarf virus, considered to be the cause of blue dwarf of oats and a dwarfing of barley, was transmitted from oats to oats and barley and from barley to both by *Macrosteles fascifrons*. Another dwarfing disease of barley, where the internodes failed to elongate and leaves were rolled tightly backwards, was attributed to another virus, either alone or combined with oat blue dwarf, and carried by the same vector.

Slykhuis (J. T.), Zillinsky (F. J.), Hannah (A. E.), & Richards (W. R.). **Barley yellow dwarf virus on cereals in Ontario.**—*Plant Dis. Reptr*, **43**, 8, pp. 849–854, 1 fig., 1959.

Observations by the Canada Dept Agric. have shown that the disease [cf. below]

has been present in S.E. Ontario for several yr. [cf. **35**, 160; map 332]. In 1958 it appeared on 15% of the oats and barley and somewhat less of the wheat in the Ottawa Valley by mid-July. *Rhopalosiphum padi*, *R. maidis*, and *Macrosiphum avenae*, all found on diseased plants in the field, were shown to be vectors. Non-viruliferous *R. padi* was generally the most efficient for isolating the virus from naturally diseased plants but failed to transmit from several samples of winter wheat and barley, whereas *M. avenae* succeeded. Experimental infection of Clintland and Garry oats and Montcalm barley by *R. padi* in the 3- to 4-leaf stage and also (other plants) 2 weeks later caused yield reductions of 75·3, 77·6, and 53·5%, and 56·1, 59·7, and 23% respectively. Infestation at the jointing stage caused no appreciable loss, and York barley was resistant even to early infection.

Rochow (W. F.). **Differential transmission of virus from leaves singly and doubly infected by vector-specific strains of Barley yellow dwarf virus.**—Abs. in *Phytopathology*, **49**, 9, p. 548, 1959.

In transmission tests from oat leaves infected by the virus [**38**, 682], str. EGV was transmitted by *Macrosiphum granarium* [*M. avenae*] in 98% of trials and rarely by *Rhopalosiphum fitchii* (3%), whereas str. AGV was transmitted regularly (98%) by *R. fitchii* and only occasionally (13%) by *M. avenae*. When source leaves were infected by both strs., vector specificity still prevailed with *M. avenae*, which transmitted EGV only from 8 such leaves, but not with the other aphid. The str. or strs. transmitted from these leaves by *R. fitchii* were subsequently transmitted regularly by both aphids, the transmission of both strs. from doubly infected leaves by *R. fitchii* being maintained in some cases through several serial transfers.

Blattný (C.). **Notes on virus sterility and stunting of Oats.**—*Folia microbiol.*, **4**, pp. 209–211, 1 fig., 1959. [Russ. summ.]

At the Inst. Biol., Czechoslovak Acad. Sci., Prague, in 1957, splice-grafting of diseased scions on healthy stocks, using single blades of each, resulted in most cases in transmission of the sterility and stunting virus [**38**, 79]. The infected plants reacted by pathologically increased shoot production, reduced ear formation, and partial leaf discoloration.

Attempts to transmit the virus to *Stellaria media* by the leafhopper *Calligypona* [*Delphacodes*] *pellucida* were unsuccessful and *S. media* plants growing near severely infected oats in natural foci were healthy.

Lindsten (K.). **A preliminary report of virus diseases of cereals in Sweden.**—*Phytopath. Z.*, **35**, 4, pp. 420–428, 4 fig., 1959. [Germ. summ.]

In studies at the Inst. of Plant Path. and Entom., Uppsala, Sweden, on a cereal disease which has been prevalent in the provinces of S. Norrland for the past 20 yr., causing heavy losses especially of oats, the author found that leafhoppers (*Calligypona* [*Delphacodes*] *pellucida*) [cf. **38**, 683] from the plants could be divided into 3 groups according to their effect: those causing no symptoms, those causing light streaks at first and later a more or less reddish colour on the leaves of oat plants, and those causing a characteristic dwarfing and excessive tillering. It was concluded that the diseases distributed by *D. pellucida* are caused by 2 viruses which have much in common but do not seem to be closely related. Virus IIa seems to be identical with wheat striate mosaic virus [**33**, 417; **38**, 9, 315], and virus IIb is more likely to be a new virus somewhat resembling the Russian 'zakuklivanie' virus [oat pseudo-rosette: **37**, 651].

Krupka (L. R.). **Metabolism of Oats susceptible to Helminthosporium victoriae and victorin.**—*Phytopathology*, **49**, 9, pp. 587–594, 8 graphs, 1959. [20 ref.]

A more detailed account of information already noticed [**39**, 102].

Grimm (R.) & Wheeler (H.). **Respiratory changes in Oats infected with Helminthosporium victoriae.**—Abs. in *Phytopathology*, **49**, 9, p. 540, 1959.

Victorin [see above] markedly increases respiration of oat tissues susceptible to the pathogen and victorin-treated tissues fail to respond to 2,4-dinitrophenol applied at concs. that markedly increase respiration in untreated tissue. There is also a sharp increase in the rate of ascorbic acid oxidation by homogenates from treated plants. Similar changes were observed in plants inoculated with *H. victoriae*, further indicating the important role of victorin in Victoria blight of oats [see below].

Lindberg (G. D.). **An approach toward biological control of Victoria blight.**—Abs. in *Phytopathology*, **49**, 9, p. 544, 1959.

When inoculum was placed in the axil of the cotyledonary leaf and in soil at the seeding zone more [oat] plants survived when *Helminthosporium victoriae* affected by a disease [**38**, 404] was used than with uninfected fungus. Cultures of normal and diseased fungus added together to the soil at seeding killed fewer plants than the normal fungus alone, and more than diseased alone. On planting 30 days after soil inoculation there were few survivals with normal *H. victoriae* and more with diseased or diseased plus normal. Single conidial cultures from diseased colonies of *H. victoriae* were normal. At 24 or 28° C. growth and toxin production of normal *H. victoriae* after 7, 14, 21, and 28 days was more than that of diseased. Growth of both was undiminished at 32°, but yield of toxin was low.

Carew (D. P.) & Schwarting (A. E.). **The infection of Rye callus with Claviceps purpurea.**—*J. Amer. pharm. Ass.*, Sci. Ed., **48**, 9, pp. 499–500, 1 fig., 1959.

At the Coll. Pharmacy, Univ. Iowa, Iowa City, callus tissue on rye embryos cultured *in vitro* (D. P. Carew & A. E. Schwarting, *Bot. Gaz.*, **119**, 4, pp. 237–239, 2 fig., 1958) readily supported the growth of *C. purpurea* which penetrated the tissues and developed intracellularly [cf. **38**, 140] but produced no alkaloids.

Crosier (W. F.) & Waters (E. C.). **Fusarium graminearum and other fungi in seedstocks of small grains.**—*Plant Dis. Reptr*, **43**, 9, pp. 1013–1015, 1959.

It is reported from N.Y. agric. Exp. Sta., Geneva, that in 1958, favoured by cool and humid weather, *Fusarium* spp., especially *F. graminearum* [*Gibberella zeae*: **36**, 394], infected many of the small grain seed stocks in N.Y. State. The fungi were present in 28, 23, 41, and 65% of well cleaned, untreated samples of barley, oats, rye, and wheat, respectively. These percentages exceed those of any other year since 1943 except of barley in 1947 and 1957 and of oats in 1947, 1949, and 1952. Infection by *Epicoccum* sp. in oat seedstocks was also a record in 1958. There was no indication of significant varietal differences in reaction to either pathogen in the 3 cereals.

Christensen (C. M.) & Qasem (S. A.). **Note on a rapid method of detecting germ damage in Wheat and Corn.**—*Cereal Chem.*, **36**, 5, pp. 461–464, 1 fig., 1959.

The determination of amounts of 'sick' wheat and maize in commercial samples [**38**, 510] is effected at the Minn. agric. Exp. Sta., St. Paul, by placing 400 kernels in a beaker, adding sufficient 2% Na $(OCl)_2$ to cover them, and boiling until they begin to whiten, when the grain is flushed twice with cold water and then examined in water in a flat-bottomed dish with the naked eye. The dark germs, readily discernible in contrast to the white or pale tan healthy ones, are counted. This expeditious method (which does not usually take more than 10–15 min.) has been found to give essentially the same results as the normal commercial procedure of determination by weight. Intergrades between dark and light wheat germs present no more difficulty with the bleaching method than with the conventional

technique, but ochre-coloured maize germs are assigned to an intermediate group; though not dark enough to be rated by commercial inspectors as damaged, they tend to be heavily invaded by [unspecified] storage moulds.

Wernham (C. C.). **Corn stalks rot trials in Pennsylvania, 1958.**—*Plant Dis. Reptr*, **43**, 8, pp. 863–870, 1959.

Studies at Pa agric. Exp. Sta., University Park, showed *Gibberella zeae* [**39**, 102 *et passim*] to be the main agent of maize stalk rot, *Diplodia maydis* being of little or no account. In assessment of damage different results are obtained according to the data used, which may involve measurements of the actual degree of tissue rot, or the more practical yardstick of 'standability', i.e. the resistance of the stalks to breakage when subject to varying treatments. From the results of inoculation experiments on 6 inbred lines of maize the latter is considered a more valuable concept for the farmer, but the difficulties involved in interpreting the data are indicated.

Cheremisinov (N. A.). Состав возбудителей болезней и пути грибной инфекции семян Кукурузы (**Zea mays L.**). [The range of causal agents of diseases and the routes for fungal infection of Maize seed.]—*Bot. Zh. S.S.S.R.*, **44**, 7, pp. 916–928, 7 fig., 1959.

At the Voronezh agric. Inst. [**38**, 365] numerous samples of maize seed and cobs were examined over a 3-yr. period and 25 spp. of fungi were isolated at different times. These fall into 2 groups, i.e. surface contaminants and those penetrating the grain. The latter were *Alternaria tenuis*, *Botrytis cinerea*, *Fusarium bulbigenum*, *F. culmorum*, *F. moniliforme* [*Gibberella fujikuroi*], *F. oxysporum*, and *Nigrospora oryzae* [**37**, 718]. Penetration and spread internally take place both in storage and during germination in a wet chamber, though the process is considerably slower in the former, but if storage is prolonged infection penetrates the deeper parts of the grain and greatly reduces germination. Seed treatment [**39**, 23] to be effective should be carried out immediately after threshing, cleaning, and grading. The development and spread of these fungi is encouraged by the somewhat high hygroscopicity of the grain, especially the germ.

Shneïder (Y. I.) & Samosudova (Mme E. V.). О наличии бактериального увядания (вилта) Кукурузы в Советском Союзе. [On the presence of bacterial wilt of Maize in the Soviet Union.]—*Proc. Lenin Acad. agric. Sci.*, **24**, 8, pp. 39–42, 1959.

Investigations by the All-Union sci. Res. Inst. Phytopath., Moscow, in 43 localities in Georgia, Kazakhstan, Kirghizia, and Uzbekistan, totalling 875 ha. of maize, all hybrids from the line 6431 and also the imported var. 3638, established that a similar wilt occurs in all the Republics. The 200 bacterial isolates from infected plants had morphological and biochemical properties very similar to those of *Bacterium* [*Xanthomonas*] *stewartii* [**38**, 365] but inoculation of Kubanska Konservnaya 148, Nagrada 97, and Pioner 373 vars. with these isolates failed, whereas a culture of *X. stewartii* from the herbarium gave positive results. It is suggested that reports of *X. stewartii* in U.S.S.R. [map 41] cannot always be justified as other bacteria may cause similar symptoms; furthermore the main vector of *X. stewartii*, *Chaetocnema pulicaria*, has never been found in the Union [**37**, 583]. *X. stewartii* may, however, become adapted to other insects, and as conditions in many regions favour development of the disease strict quarantine is recommended.

Maramorosch (K.). **An ephemeral disease of Maize transmitted by Dalbulus elimatus.**—*Ent. exp. & appl.*, **2**, pp. 169–170, 1 fig., 1959. [Germ. summ.]

Symptoms closely resembling those of wallaby ear disease in Australia [**38**, 563]

were induced in maize leaves by feeding nymphs of *D. elimatus* [**38**, 202]. The symptoms were temporary swellings of the leaf veins, reaching a max. on the 12th day and disappearing completely within 25 days. Other leafhoppers of the same sp. and of *D. maidis* fed on the affected leaves failed to transmit the condition, which it is suggested is caused by an insect toxin rather than a virus, and the Australian disease may possibly be of the same nature.

Atkins (J. G.) & Lamey (H. A.). **Hoja blanca disease of Rice.**—Abs. in *Phytopathology*, **49**, 9, p. 533, 1959.

This account of the disease notes its occurrence in Salvador, Guatemala, and Surinam, in addition to areas already noticed [**38**, 516; map 359].

Ciferri (R.). **Lineamenti per una storia del Riso in Italia.** [Outlines for a history of Rice in Italy.] *Quad. Ente naz. Risi* 8, 41 pp., 34 fig., 1 map, [? 1959].

In this interesting and lavishly illustrated publication a number of references are made in the text to the history of 'brusone' (*Piricularia oryzae*) [**36**, 723 *et passim*.]

Zsoldos (F.). **Quantitative changes in γ-aminobutyric acid induced by low temperature in Rice plants.**—*Nature, Lond.*, **184**, 4682, p. 280, 1 fig., 1959.

At the Inst. Plant Physiol., Univ. Szeged, Hungary, the guttation exudates from shoots of rice plants removed shortly after flowering were analysed chromatographically for free amino-acids. Exudates from Dunghan Shali (susceptible to 'akiochi' disease or 'brusone' [*Piricularia oryzae*: cf. above]) lacked γ-aminobutyric acid when kept for some days at low temp. (12–14° C.), but not those from the resistant Precoce Allorio [**38**, 741]. The γ-aminobutyric acid content was similar and constant in both vars. when kept at normal temp. (20–22°).

Uehara (K.). **On the production of phytoalexin by the host plant as a result of interaction between the Rice plant and the blast fungus (Piricularia oryzae Cav.).** *Ann. phytopath. Soc. Japan*, **23**, 3, pp. 127–130, 1 diag., 1958. [Jap. Abs. from Engl. summ.]

At Hiroshima agric. Coll., Saijo, drops of conidial suspension of *P. oryzae*, placed on detached pieces of rice leaf at points pricked by a glass capillary and held for 24 hr. at 25–30° C. in a moist chamber, were then collected and centrifuged for 20 min. at 3,000 r.p.m. The resultant supernatant strongly inhibited germination of other conidia of *P. oryzae*, because of a phytoalexin [**36**, 49] produced by interaction between the rice plant and the fungus. The resistant rice vars. Kameji and Norin 22 produced phytoalexin more vigorously than the susceptible Asahi and Omachi.

Yagi (H.) & Hirata (K.). **On the structure of conidia of Cochliobolus miyabeanus.**—*Ann. phytopath. Soc. Japan*, **23**, 3, pp. 135–138, 4 fig., 1958. [Jap. Abs. from Engl. summ.]

Studies at Niigata Univ. showed that the 'septa' in fresh conidia of *C. miyabeanus* vanish entirely soon after germination. The component cells of the conidia round off, forming a chain of spherical bodies, with slender connectors in between, filling the conidium, and the areas of contact between the bodies appear like cross walls. During germination the spherical bodies become vacuolated, starting with the innermost, and apparently send nutrients to the germ tube. When separated mechanically from the conidium these spherical bodies can germinate individually. The brown chitinous conidial wall is lined with a colourless, non-chitinous membrane, soluble in chloral hydrate solution.

Yoshii (H.), Asada (Y.), Kiso (A.), & Akita (T.). **Antifungal antibiotic 'funicularin' produced by Bacillus funicularis and its effect upon the susceptibility of Rice seedling to Helminthosporium blight.**—*Ann. phytopath. Soc. Japan*, **23**, 3, pp. 150–154, 1958. [Jap. Abs. from Engl. summ.]

A new antifungal antibiotic, temporarily called funicularin, isolated from the culture filtrate of *B. funicularis*, which was found in a leaf spot of *Helminthosporium* blight [*Cochliobolus miyabeanus*] on rice, inhibited germination of conidia of *C. miyabeanus*. Immersion of the roots of rice seedlings in the culture filtrate lowered their susceptibility to blight, and reduced the index of leaf spot enlargement.

Chattopadhyay (S. B.) & Dickson (J. G.). **Induced mutation in Helminthosporium oryzae and the relation of nitrogen to disease development in Rice.**—Abs. in *Phytopathology*, **49**, 9, p. 536, 1959.

Previous work on *H. oryzae* [*Cochliobolus miyabeanus*: **38**, 582] is summarized. Ultraviolet irradiation of germinating conidia and young hyphal fragments induced albino mutants in most strains of the pathogen, though not in all, without apparent change in conidial production or pathogenicity, though both fine and coarse mycelial types appeared. The albino mutants served to demonstrate the heterokaryotic nature of the mycelial cells and reassortment of nuclei by anastomosis of germ tube cells from albino and black conidia.

Seedlings of 6 rice vars. susceptible or moderately resistant to the pathogen, grown in sand at 28° C. with 4 N levels of 0·5 N Hoagland's solution, were assessed for reaction to 3 isolates (including an albino mutant). Max. disease and varietal reaction occurred at low (105 p.p.m.) and high (329) N as NH_4NO_3.

Udagawa (S.). **Taxonomic studies of fungi on stored Rice grains. III. Penicillium group (Penicillia and related genera) 2.**—*J. agric. Sci. Tokyo Nogyo Daigaku*, **5**, 1, pp. 5–21, 6 pl. (34 fig.), 17 fig., 1959.

In further studies [cf. **38**, 204] 14 spp. of *Penicillium* (4 new) and 2 of *Scopulariopsis* (1 new) are described; 4 are new records for Japan. In addition, a further sp. of *Aspergillus* [loc. cit.] is included.

Economides (C. V.) & Ruck (H. C.). **Virus diseases of Citrus in Cyprus.**—*Countryman, Nicosia, 1959*, pp. 14–17, 6 fig., 1959.

In a recent systematic survey citrus psorosis virus [map 65] was identified in only 1 orchard, on Valencia orange; no infection was found on Shamouti. Xyloporosis is the main disease of Shamouti orange on sweet lime and is more widespread than originally thought, incidence ranging from 5–90%. Infection was detected in 1 old sweet lime seedling, indicating that the virus may be seed-borne. There were also severe symptoms in the trunks of sour orange seedlings. Little leaf virus [cf. **36**, 23] of Shamouti on sour orange or sweet lime varies in symptom expression but typically causes an off-season blooming (late Sept.–Feb.).

Radatz (W.). **Untersuchungen zur 'Gelbnervigkeit' der Apfelsinerblätter Citrus aurantium sinensis (Gall.).** [Studies on 'vein-yellowing' of Orange leaves.]—*Phytopath. Z.*, **35**, 2, pp. 148–172, 12 fig., 1959. [Engl. summ.]

At the Bot. Inst. der Techn. Hochschule, Brunswick, vein yellowing [**20**, 398] was induced in 3-month-old sweet orange seedlings by ringing the shoot, particularly in April and May. Symptoms were shown to be the result of increased photosynthesis and accumulation of starch; ringed plants in continuous light display symptoms in the shortest time, those in normal light develop them only in spring, and those in a 4 hr.-day have none. Increased respiration also plays an essential part. Infiltration experiments indicated an abnormal closure of the stomata of

chlorotic leaves. In old affected leaves there is practically no starch. Abnormal starch accumulation, closure of the stomata (O deficiency), and erect leaf position (disturbance of ion antagonism) are presumed to be related. The blackening of the vessels suggests that phosphates in the cells are involved in the reactions. They appear to be responsible for the intense blackening of the protoplasm and cell walls in the leaves. A reduction in translocation of carbohydrates (in which phosphatase is involved) in deep planted orange trees, resulting from O deficiency, is regarded as the factor responsible for vein yellowing.

ZACHOS (D. G.) & GEORGOPOULOS (S. G.). **Le Sclerotinia sclerotiorum (Lib.) Massee sur le Citronier en Grèce.** [*S. sclerotiorum* on Lemon in Greece.]—*Ann. Inst. phytopath. Benaki*, N.S., **1**, 6, pp. 332–333, 1 pl., 1958.

S. sclerotiorum, a common pathogen in Greece, [**31**, 250] was identified as the cause of lesions at the base of lemon shoots, which led to their drying up.

FISHER (FRANCENIA E.). **Ferbam will control Citrus scab.**—*Citrus Mag.*, **21**, 6, pp. 14, 28, 2 fig., 1959.

At the Citrus Exp. Sta., Lake Alfred, 2 ferbam treatments (or 1 Cu followed by 1 ferbam) on sour orange against *Elsinoe fawcettii* [**39**, 77], applied as delayed dormant sprays at the appearance of pin-point growth and when $\frac{2}{3}$ of petals had fallen, gave somewhat better control than 2 Cu applications, ferbam apparently giving more protection to the young leaves. The rates of ferbam application recommended are 2, 1½, and 1 lb. 100 gal. on groves with severe, intermediate, and light infection, respectively.

DURBIN (R. D.). **The possible relationship between Aspergillus flavus and albinism in Citrus.** *Plant Dis. Reptr.* **43**, 8, pp. 922–923, 1 fig., 1959.

At the Inst. Agric., Univ. Minn., St. Paul, when sweet orange and grapefruit seeds were inoculated with *A. flavus* strs. which had been shown to cause albinism in maize [**18**, 173], 43 and 28% albinism, respectively, occurred in the resulting seedlings [cf. **18**, 247], compared with none in the controls. The fungus could be isolated from the seed coat, but not from the remainder of the seedling. It would appear that saprophytic growth of *A. flavus* produces a metabolite in the seed coat which is taken up by the seedling and inhibits chlorophyll formation.

MIYAKAWA (T.). **Effect of Orange rind extract on spore germination of Penicillium digitatum.**—*Ann. phytopath. Soc. Japan*, **23**, 3, pp. 121–126, 1958. [Jap. Abs. from Engl. summ.]

At the Ikuhina hort. Exp. Sta., Tokushima Prefecture, it was found that a substance readily extracted from orange rind [cf. **37**, 24] with water and adsorbed on activated charcoal, when eluted by 60–80% acetone stimulated germination of spores of *P. digitatum* only when used with the filtrate (charcoal treated extract) or with a very small amount of phosphate. Thus P compounds would appear to be the active basis of the stimulant, which seems either to consist of 2 fractions, 1 absorbed by charcoal and 1 not, or is separable into 2 compounds by charcoal, and recovers its properties on addition of P compounds.

HARDING (P. R.). **Relative humidity in Citrus cartons as influenced by external temperature and relative humidity.**—*Plant Dis. Reptr*, **43**, 8, pp. 893–897, 5 graphs, 1959.

The effects of the external temp. and R.H. on vapour pressure and the consequent prevailing R.H. within vented and unvented fibreboard citrus cartons are outlined. After an initial drop in R.H. when the cartons are transferred to a lower temp. there is a rise to a level sufficient to induce the release of ammonia from moisture sensitive sheets used to control *Penicillium* spp. [**38**, 144].

Beraha (L.), Ramsey (G. B.), Smith (M[arion] A.), & Wright (W. R.). **Studies on control of stem end rots of Oranges with gamma radiation.**—Abs. in *Phytopathology*, **49**, 9, p. 534, 1959.

When Florida Valencia oranges, inoculated with *Diplodia natalensis* and *Phomopsis* [*Diaporthe*] *citri*, were held at 70–75° F. for 23 days after irradiation [cf. **36**, 410; **38**, 517], at least $2{\cdot}75 \times 10^5$ rad (1 rad = 100 ergs/g.) was required to check *Diplodia natalensis* appreciably; at 2×10^5 or lower there was more and faster rotting; at $4{\cdot}5 \times 10^5$ no infection was visible after the holding period. With *Diaporthe citri* $0{\cdot}9 \times 10^5$ rad reduced rotting significantly and $1{\cdot}15 \times 10^5$ prevented it for the period. *In vitro*, hyphae of the former were killed by $4{\cdot}65 \times 10^5$–$8{\cdot}9 \times 10^5$, and of the latter by $0{\cdot}46 \times 10^5$–$0{\cdot}9 \times 10^5$. Injury to fruit was proportional to dosage, with a threshold around $2{\cdot}75 \times 10^5$; severe injury occurred at $4{\cdot}5 \times 10^5$ and textural changes of pulp after 9×10^5 rad.

Cohen (M.). **Timing of sprays for control of greasy spot disease of Citrus.**—Abs. in *Phytopathology*, **49**, 9, p. 536, 1959.

Studies at Fort Pierce, Fla, indicated that greasy spot [*Mycosphaerella* sp.: **39**, 78] may develop 2–6 months after the appearance of a leaf flush, causing peak losses in dry periods and in spring. Sprays are best applied to fully expanded flushes at any time up to 6 months after expansion, depending on the season.

West African Cotton Research Conference, held at the Regional Research Station, Ministry of Agriculture, Samaru, Northern Nigeria, 18th to 23rd November, 1957.—v+209 pp., 5 diag., 15 graphs, 4 maps, [? 1959]. 15*s*.

In the account of the Pathology Session (pp. 23–29) is the discussion on papers by M. H. Arnold (Appendix XXIV, pp. 159–165) on resistance to bacterial blight (*Xanthomonas malvacearum*) in Lake Province 'local' cotton and H. M. Parker (XXV, pp. 166–174) on 'The survival of bacterial blight of Cotton (*Xanthomonas malvacearum* (E. F. Smith) Dowson) in crop debris'; each has a French summary.

The 1st paper stated that the programmes of selection from Lake Province 'local' cotton began in 1939, and from attempts to isolate lines resistant to bacterial blight [**38**, 381], a leaf spray inoculation technique being adopted, it was concluded that strains derived from 'local' lacked sufficient resistance, but more recent experiments, using needle prick inoculations [**32**, 374], revealed marked variation in stem resistance in strains from 'local'. The most recent seed issue, Uk 55, is much more resistant than earlier ones, and other high-yielding strains also were relatively highly resistant. These were largely produced in the absence of controlled selection for resistance, the main criterion of selection being yield, and the inference is that bacterial blight resistance, in an area where infection is prevalent, is sufficient to have influenced such selection. The evidence also indicated that resistance to boll rot [cf. **36**, 644] has been an important factor in selection.

In the 2nd paper, after a review of the literature, field trials are described which showed that in 2 seasons (1956–7–8) at Samaru, diseased debris protected from weathering was able to infect emerged seedlings of 10 vars. and selections of cotton whether the seed had been successfully disinfected with an organo-mercurial or not, whereas debris exposed to weathering was almost certainly effectively sterilized. In 1956 rainfall was only 11·16 in. during the period of exposure, the lowest for 32 yr.

Brinkerhoff (L. A.). **Variability for pathogenicity of Xanthomonas malvacearum.**—Abs. in *Phytopathology*, **49**, 9, p. 534, 1959.

In Oklahoma races of *X. malvacearum* [**36**, 185; cf. **38**, 746] were distinguished on seedlings of 12 cotton vars., 7 with genes B_1, B_2, B_3, B_4, B_5, B_2B_6, and B_2B_3, selected for resistance to the pathogen in the Republic of the Sudan by Knight [**33**, 537

et passim], 4 American vars. with genes b_7 [**38**, 599]. B_{IX}, B_L, and B_N, and a check var. susceptible to all collections. Cultures of the pathogen from Okla and elsewhere in U.S.A. generally attacked plants with B_3 and B_5, and often B_{IX}. An occasional infected seedling from each differential (except B_2B_6 and B_2B_3) yielded an isolate pathogenic to the host from which it was obtained. A culture from Uganda attacked all except B_2B_6; 1 from Sudan attacked B_2, B_3, and B_5; 1 from Nigeria, B_{IX}, B_L, and b_7; and 1 from Portuguese E. Africa, B_2, B_3, B_4, and B_5. An isolate genetically resistant to streptomycin and penicillin [cf. **38**, 694] produced 2 mutants that attacked B_N and b_7, respectively, retaining resistance to streptomycin, but not to penicillin, after 4 host passages.

Maier (C. R.). **Cultural and pathogenic variability of Rhizoctonia solani isolates from Cotton-growing areas of New Mexico.** —*Plant Dis. Reptr.*, **43**, 10, pp. 1063–1066, 1959.

At the New Mex. agric. Exp. Sta., University Park, 245 isolates of *R.* [*Corticium*] *solani* [**39**, 105] from diseased cotton and soil samples were grouped into 10 strains on the basis of their cultural variation, which was limited, and pathogenicity to cotton sown in infested soil. The strains, ranging from non- to highly pathogenic, maintained their respective levels through several experiments, with similar performance on both Upland (Acala 1517C) and American–Egyptian (Pima 32).

Bilai (V. I.), Zanevich (V. Y.), & V'yun (A. A.). До характеристики антибіотичних властивостей грибів з роду **Penicillium Lk.** ризосфери сільськогосподарських рослин України. [On the character of the antibiotic properties of fungi of the genus *Penicillium* from the rhizosphere of agricultural plants in the Ukraine.] *J. Microbiol., Kiev*, **21**, 2, pp. 35–39, 1959. [Russ. summ.]

At the Inst. Microbiol., Ukr. S.S.R., of 725 *Penicillium* cultures isolated in 1952 from the rhizospheres of flowering cotton plants in different soils in S. Ukraine, *P. urticeae* (most strains), *P. multicolor*, *P. waksmanii*, and *P. variabile* inhibited *Bacterium* [*Xanthomonas*] *malvacearum* [cf. **38**, 573].

Frederiksen (R. A.) & Goth (R. W.). **Crinkle, a new virus disease of Flax.**—Abs. in *Phytopathology*, **49**, 9, p. 538, 1959.

This disease, named flax crinkle [see below] was 1st seen at St. Paul, Minn., in 1956, and occurred throughout Minn. and N. and S. Dakota in 1957, occasionally causing 20% field infection, and in some test plots 64%. All commercial flax vars. tested proved susceptible. Protrusions occur at irregular intervals on the main lateral veins of the apical leaves. Seed yield is reduced. The virus was transmitted by *Macrosteles fascifrons* [**38**, 501] and by dodder but not mechanically; attempts to infect asters failed. Flax inoculated with both aster yellows virus and crinkle developed a chlorotic apical swelling, not produced by either virus alone.

Banttari (E. E.) & Frederiksen (R. A.). **Transmission of Oat blue dwarf virus to Flax.**—Abs. in *Phytopathology*, **49**, 9, p. 539, 1959.

Oat blue dwarf virus [**39**, 165] was transmitted in field and greenhouse from oats and barley to flax by *Macrosteles fascifrons*, producing the symptoms described as flax crinkle [see above]. The virus was transmitted back to oats by the insect.

Desai (M. V.) & Shah (H. M.). **A new bacterial leaf-spot of Crotalaria juncea L.** —*Curr. Sci.*, **28**, 9, pp. 377–378, 2 fig., 1959.

C. juncea leaves bearing round, water-soaked spots of about 1–3 mm., with a dark brown centre surrounded by a distinct halo, were collected in Aug. 1958 from the Inst. Agric., Anand, India. As the spots enlarged the centre became whitish with a dark brown margin, and in advanced stages they became irregular and coalesced,

covering most of the leaf. The lower leaves were infected first and, if severely, fell prematurely. Sometimes the central part of the spot became separated, forming a shot hole. The bacterium isolated, for which the name *Xanthomonas patelii* is proposed, is very briefly characterized. It caused spotting on inoculated *C. juncea* but not on *Desmodium diffusum*, cowpea, *Dolichos lablab*, pigeon pea, cotton, or *Phaseolus vulgaris*.

North (C. P.), Wallace (A.), Ryan (G. F.), & Mueller (R. T.). **Iron-virus relations in Camellia.**—*Camellia Rev.*, **21**, 1, pp. 3–5, 23, 5 fig., 1959.

A report of this work at Calif. Univ., Los Angeles, has been noticed [**38**, 602]. Where virus-infected plants are treated with Fe the greening effect may be expected to extend over 6–18 months and the applications should be made in small amounts at regular intervals though it should be remembered that desirable flower variegations may be masked. The rate tentatively suggested for 3-gal. containers is ½ teaspoonful of chelated Fe/plant every 6–8 weeks for 6 months. A normal camellia plant contains 0·005–0·02% dry wt. of Fe. If this level is exceeded damage may result. On acid soils $FeSO_4$ may be used. Where a plant is severely virus-infected only small amounts of N should be given, as the chlorotic leaves do not metabolize it fast enough to prevent leaf burn.

Wager (V. A.). **Carnations are susceptible to many diseases.**—*Fmg in S. Africa*, **35**, 5, pp. 26–28, 6 fig., 1959.

The leaf diseases caused by *Uromyces caryophyllinus* [*U. dianthi*], *Alternaria dianthi*, *Septoria dianthi*, and *Heterosporium echinulatum* [*Didymellina dianthi*] are described as an aid to growers; recommendations are made for spraying with Cu oxychloride at 2 oz./4 gal.+½ teaspoonful of triton B or agral L.N. A complex wilt and crown rot caused by 1 or more of the fungi *Rhizoctonia* [*Corticium*] *solani*, *Fusarium dianthi*, *Phytophthora cactorum*, and *Sclerotium rolfsii* occurs most frequently on heavy, wet soil, occasionally causing heavy losses. Plants should be grown on ridges; if they become affected, watering should be restricted and the Cu spray solution may be used for watering or treating the growing slips.

Booth (J. A.) & Alcorn (S. M.). **Seedling rot of Carnegia gigantea (Engelm.) Britt. & Rose caused by Fusarium spp.**—*Plant Dis. Reptr*, **43**, 9, pp. 1038–1041, 1 fig., 1959.

The cortical stem tissues of saguaro (*C. gigantea*) seedlings, used in research in Tucson, Ariz., become black and watery, with breakdown, the disease often progressing through the vascular system into the roots, though the reverse process is but infrequently seen. Isolation and inoculation showed 3 clones of *F. oxysporum* [cf. **37**, 356] and 1 of *F. solani* to be responsible; they were also pathogenic to 5 other spp. of cacti. Invasion is primarily through wounds.

Tammen (J.). **Stemphylium ray speck of Chrysanthemum morifolium.**—Abs. in *Phytopathology*, **49**, 9, p. 552, 1959.

The species responsible for this disease affecting ray but not disk florets in Pa and Fla, 1956–7, is near *S. floridanum*; this appears to be a 1st record of *S.* on *C. morifolium*. Opt. temp. for disease development was 27° C., symptoms appearing within 18–24 hr., but it was sharply reduced at 30°, and there were no symptoms at 2° or 35°. Orange, Beauregard, Forty Niner, Encore, Gold Ball, and White Top proved susceptible.

Mildner (R. A.) & Scheffer (R. P.). **Mechanical transmission and host ranges of Dahlia ring spot viruses.**—Abs. in *Phytopathology*, **49**, 9, p. 546, 1959.

Using Yarwood's leaf-disk method of inoculation, each of 5 different types of ring

spot from 5 dahlia vars. was transmitted to cowpea, *Datura tatula*, and Unwin dahlia, none to *Nicotiana*, isolates 1 and 3 to tomato, and all but 1 to *Gomphrena globosa*. Gloxinia was very sensitive to 1, 2, and 3, but not 4. Apparently several viruses or different strs. of one virus cause dahlia ring spot. Neither tomato spotted wilt virus [cf. **38**, 521] nor cucumber virus 1 [cucumber mosaic virus] was found. Symptoms over the range 17–28° C. tended to be more severe at the higher temps.

Burkholder (W. H.). **The causal agents of the black stem disease of annual Larkspur.**—*Plant Dis. Reptr*, **43**, 8, pp. 934–935, 1959.

Inoculation of larkspur (*Delphinium ajacis*) at Cornell Univ., Ithaca, N.Y., with isolates of a number of spp. of *Erwinia* through stem wounds showed that *E. atroseptica* and *E. chrysanthemi* can cause a black stem disease [cf. **17**, 604], and that *E. aroideae* and *E. carotovora* may infect young plants and induce a green, watery rot, followed by death.

Tompkins (C. M.). **Wilting of Poinsettia, a disease of unknown etiology.**—*Plant Dis. Reptr*, **43**, 10, pp. 1067–1069, 2 fig., 1959.

From the Univ. Calif., Berkeley, is reported a sudden wilt and often premature death of poinsettia (*Euphorbia pulcherrima*) plants under glass in the San Francisco Bay region. All vars. are infected, particularly Indianapolis and Barbara Ecke Supreme, with 20–60% loss of crop. The symptoms appear 1st on the lowest leaves and progress upwards, yellowing and marginal, upward curling being followed by abscission. There is a slight vascular discoloration in the main stems. The principal damage occurs when the bracts begin to change colour. Studies have so far failed to determine the cause and control of the disease.

Treatment of Gladioli corms.—*Agric. Gaz. N.S.W.*, **70**, 6, pp. 301–305, 3 fig., 1959.

A note on control of *Sclerotinia* dry rot [*S. gladioli*: cf. **38**, 148], *Botrytis* [not specified: **37**, 134] and *Septoria* hard rot [*S. gladioli*: loc. cit.]. As a dip phenyl mercury acetate (1 part of a 2½% emulsion 100 parts of water for 15–30 min.) is recommended, and for drying a rise of temperature to 95° F. for 1 week may be necessary.

Forsberg (J. L.). **Relationship of the bulb mite Rhizoglyphus echinopus to bacterial scab of Gladiolus.**—Abs. in *Phytopathology*, **49**, 9, p. 538, 1959.

Pseudomonas marginata [**36**, 188] is successfully controlled by soil treatment with aldrin or heptachlor. Clean and scabbed corms both produced clean corms when planted in steamed soil, and also scabbed corms in untreated soil from a field where the disease had occurred. *R. echinopus* was found on all scabbed corms but on none of the clean ones. *P. marginata* developed on potato dextrose agar plates to which the mites had been transferred, and on which they multiplied. In soil infested with such cultured mites, severe scab developed. In soil to which a broth culture of *P. marginata* was added only a few minor lesions developed on the plants.

Gäumann (E.) & Kern (H.). **Über chemische Abwehrreaktionen bei Orchideen.** [On chemical defensive reactions in Orchids.] –*Phytopath. Z.*, **36**, 1, pp. 1–26, 1 fig., 1 diag., 2 graphs, 1959. [Engl. summ.]

In further work at the Eidg. Techn. Hochschule, Zürich [**37**, 646], no trace of orchinol was found in healthy *Orchis militaris* tubers, but it was detected by paper chromatography in those infected by *Rhizoctonia repens* (3 g./kg. fresh wt.). It possesses a strong fungistatic activity against *R. repens*. In infected roots, however, the orchinol content is less than 1% of that of infected tubers and therefore not high enough to protect the roots from this fungus. Six orchid spp. produced orchinol in response to infection by *R. repens*. Though *O. ustulata* and *Loroglossum hircinum* were unable to do so, they did produce *in vitro* typical zones of inhibition against *R. repens*; thus their particular chemical defence reactions must be based on

substances other than orchinol. *Didymella exitialis*, *Fusarium solani*, *Ophiobolus graminis*, and *Orcheomyces hircini* were also able to induce the synthesis of orchinol in *Orchis militaris* tuber tissue but *Aspergillus niger* and *R.* [*Corticium*] *solani* were not. *Alternaria tenuis*, *Botrytis allii*, *B. cinerea*, *Coniothyrium* [*Coniella*] *diplodiella*, *F. solani*, and *Corticium solani* reacted clearly to orchinol, which persists for months in the infected tuber tissues, thus leading to an acquired immunity.

An antibody in the biological sense is defined as a characteristically formed substance synthesized by the host in response to an infection; in turn it acts against the pathogen which has initiated its formation.

Braverman (S. W.). **Stemphylium species on Comfrey.**—*Plant Dis. Reptr.* **43**, 9, p. 1050, 1 fig., 1959.

At the Regional Plant Introduction Sta., Geneva, N.Y., in 1957–8, a severe leaf spot on the lower leaves of comfrey (*Symphytum peregrinum*) was found to be caused by a *Stemphylium* sp., with conidia similar to those of *S. botryosum* [*Pleospora herbarum*], but it was non-pathogenic to red and white clover, lucerne, and birdsfoot trefoil [*Lotus corniculatus*]. This is the 1st report of *Stemphylium* on comfrey.

Dubos (R. J.). **Tulipomania and the concept of disease.**—*Trans. N.Y. Acad. Sci.*, Ser. II, **26**, 8, pp. 785–786, 1958.

This interesting résumé of the history of 'breaking' in tulips contains a brief reference to a similar phenomenon in other flowers, e.g. wallflower, larkspur [*Delphinium*], pansy, and camellia. Mention is also made of leaf mottling in the pale-veined type of honeysuckle [*Lonicera*], probably the most recently recognized example, as well as in the familiar *Abutilon striatum* var. *thompsonii*. In conclusion, attention is drawn to the biological advantages conferred on their hosts under appropriate ecological conditions by ornamental viroses of the kind under discussion.

Gerlach (W.). **Über eine durch Fusarium oxysporum Schl. hervorgerufene Fäule der Tulpenzwiebeln.** [On a rot in Tulip bulbs caused by *F. oxysporum*.]—*NachrBl. dtsch. PflSchDienst* (*Braunschweig*), *Stuttgart*, **11**, 5, pp. 65–67, 4 fig., 1959. [Engl. summ.]

At the Biologische Bundesanstalt, Institut für Mykologie, Berlin-Dahlem, *F. oxysporum* was isolated from Fridtjof Nansen tulip bulbs from E. Friesland, where a rot had occurred since 1955. Several isolates on 6 media, from different bulbs, were similar macroscopically and in spore measurements. Pathogenicity was proved by an infection test on the same var. The dry rot usually develops at the base of the bulb, subsequently spreading fairly rapidly. Initial symptoms are small, flat, sunken, beige flecks on the outer fleshy scales, which enlarge and coalesce to cover extensive areas of the bulb surface. The infected tissue turns amber or dark brown. Rot areas are frequently coated with a sandy-rose-coloured flat mycelial crust, especially when the development of the fungus is favoured by high temp. and humidity. Dark, indented marginal zones, mostly unequally curved, with diffuse coloured edges several mm. wide extending into the externally still unaffected bulb tissue, are conspicuous. Even in extensive rot areas penetration is shallow but once the base is attacked the fungus then grows up within the bulb, infecting the internal leaf and flower initials and gradually causing the whole bulb to rot.

Couch (H. B.) & Bloom (J. R.). **Influence of nutrition, pH, and soil moisture on the development of dollar spot.** —Abs. in *Phytopathology*, **49**, 9, p. 537, 1959.

Agrostis palustris and *Poa pratensis* were grown in sand culture over ranges of

nutritional levels and pH and after emergence inoculated with aqueous mycelial suspensions of *Sclerotinia homoeocarpa* [32. 131]. Low N with normal P and K, or total low nutrients decreased disease severity, while high balanced nutrients increased it. P and K levels had no effect nor had changes of pH from 4 to 10. Over 5 moisture levels ranging from field capacity to permanent wilting, induced by varying time of irrigation before inoculation, percentage disease development increased with high moisture stress, i.e. allowing plants to extract to ⅔ field capacity or below.

Drachev (S.) & Hanson (L.). **Inheritance of necrotic, mottle, and resistant reaction to Bean yellow mosaic virus in clones of Red Clover.** Abs. in *Phytopathology*, **49**, 9, p. 537, 1959.

[At the Univ. Ky, Lexington; 38. 322] populations of Kentucky red clover inoculated mechanically with isolate 205 [of the above virus] became 30–50% infected. After 4–5 re-inoculations of symptomless survivors, 75–90% of the plants were ultimately mottled, 3–6% locally or systemically necrotic, and 5–10% symptomless (resistant). Crossing indicated necrotic spotting to be conditioned by 1 dominant factor (N) and resistance by a factor R, dominant to mottling and epistatic to N. The genotypes of the clones of the Ky C-series used appear to be: mottling clones 36 and 5–11, rarr; necrotic spotting clones 6 and 71–5, Nnrr; resistant clone 101, NnRr; and resistant clone 102, nnRr.

Cui (C.-C.) & Hanson (E. W.). **Effects of concentration of a balanced-nutrient solution on the development of Red Clover in uninfested sand and sand infested with Fusarium spp. Relation of soil factors to development of root rots of Red Clover incited by Fusarium spp.** Abs. in *Phytopathology*, **49**, 9, p. 536, 1959.

After 65 days in sand in pots into which Hoagland's solution at 0·05, 0·1, 0·5, 1, and 2 (all + trace elements) was dripped at rate 1 000 ml./day, development of Lakeland red clover was best at 0·5, though good at 0·1–1. Disease development from inoculation with *F. oxysporum* and *F. solani* was max. at low nutrient concn., min. at opt. for the host, and intermediate at those above opt. Nutrient conc. affected host more than pathogen.

The 2nd abstract notes that max. infection of 4 vars. by *F. solani*, *F. oxysporum*, and *F. roseum* [cf. **37**. 547] after 75 days at a range of 12–32° C. occurred at 25°, little at 12–16°. The host grew best at 24° and disease developed more in dry than in wet soils, though very wet soils caused root degeneration. Within a pH range of 3–9 at 22–24° best growth of host and max. disease occurred at 5–7. Top and root growth decreased and disease increased with omission of N, P, or K from the nutrient solution, N having the most effect. *F. solani* was the most pathogenic, followed in turn by *F. oxysporum* and *F. roseum*; antagonistic and synergistic effects were observed with varying combinations of these fungi.

Fazar (K. D.) & Ross (A. F.). **Assay of Alfalfa mosaic virus activity.**—*Phytopathology*, **49**, 8, pp. 529–530, 1959.

Of 11 bean (*Phaseolus vulgaris*) vars. inoculated mechanically at Cornell Univ., Ithaca, N.Y., with lucerne mosaic virus [cf. **38**. 249] (str. ATC 57 from Turkish tobacco infected 11–12 days [cf. **20**. 473]), Bountiful and Tendergreen were the most useful local lesion test-plants; Red Kidney and Yellow Eye were also satisfactory. The potato calico strain of the virus [**19**. 563] gave somewhat smaller lesions.

It was found that ⅔–¾ of the potential activity of the virus may be lost if the buffer is added even immediately after grinding infected leaves to prepare virus extracts; the infected leaf tissue should therefore be in buffer solution while being ground.

Milbrath (J. A.). **Thermal inactivation of Alfalfa mosaic virus in vitro.**—Abs. in *Phytopathology*, **49**, 9, p. 546, 1959.

When the inactivation of 24 strs. of lucerne mosaic virus was determined on Black cowpea in concs. allowing local-lesion counts, rather than by systemic reaction, it was found that though occasional infective particles will survive > 60° C., as much as 50% inactivation occurs at 42°. A typical series was: unheated, 116 local lesions; 42°, 52; 44°, 3·6; 46°, 2·8; 48°, 0·4; and 50°, 0·05.

Blattný (C.). **Virus papillosity of the leaves of Lucerne.**—*Folia microbiol.*, **4**, pp. 212–215, 5 fig., 1959. [Russ. summ.]

During June–July 1958 the author observed a disease affecting some 50% of the plants in lucerne fields near Bucharest, Romania; in the city only lucerne mosaic virus was present. The plants were abnormally short and some of the leaves were crumpled. Another feature was the occurrence on the under surface of 1st- and 2nd-order veins of papillae of different sizes or short, whitish spines, with corresponding hollows, sometimes funnel-shaped, on the upper surface. Some leaves were crooked, with a downward trend, and folded along the central vein, below which up to 3 papillae might be found side by side. Such plants were frequently infected by mosaic as well as by the new virus and both developed together after transmission by grafting, the incubation period being 25 days. The virus was not transmissible by sap inoculation or (up to the time of writing) by means of the leafhopper *Calligypona* [*Delphacodes*] *pellucida* and appears to be distinct from the known viruses of the Papilionaceae.

Elliot (A. M.). **The effects of temperature on ascospore ejection by Pseudoplea briosiana.**—Abs. in *Phytopathology*, **49**, 9, p. 538, 1959.

The fungus [**35**, 21] overwintered in 1957–8 as ascospores and mycelium. Ascospores were ejected in the field, and germinated at 4–37° C., more being ejected at 30° than at 10 to 20°. After ascospore ejection stopped at a temp. within the 4-30° range a 10° rise incited resumption in 45% of the tests. The ascocarps withstood repeated freezing and thawing (−10° to 4°) and continued ejection, which also occurred after repeated wetting and drying at 30°. From well developed lesions on lucerne inoculated in the greenhouse 35% more ascocarps formed at 30° than at 10 or 20°, but ascospores were produced only at the 2 lower temps.: with this same material the temp. threshold was 2·5° and it was necessary to have 51 day-degrees (°C. above 2·5° × days) for ascocarp formation and initial ascospore ejection. With leaves from the field an average of 120 day-degrees was needed for the same processes at 10 and 20°.

Garrett (S. D.). **Armillaria root disease in orchards.**—*Agriculture, Lond.*, **66**, 8, pp. 331–335, 1959.

A popular account of the diagnosis of the disease (*A. mellea*) and the standard methods for its control.

Recent studies on virus diseases of Apple in the United States and Canada.—*Plant Dis. Reptr, Suppl.* 254, 36 pp., 4 fig., 1959.

This is a collection of 10 papers. Observations in Maine on apple 'stem pitting' virus [**36**, 328] (R. C. McCrum & M. T. Hilborn, pp. 3–5) showed that there were 2 general types in 38 kinds of grafted stocks in 2 experimental plantings: (1) where the sapwood was uniformly pitted with short longitudinal depressions, the bark being thick, brittle, and yellow: and (2) a very fine knitted pattern of slightly raised, narrow greyish longitudinal areas; 14 stocks, including Antonovka zheltaia, showed no pitting.

A small survey by R. C. McCrum (pp. 6–7) in 1958 showed that all non-pitted Virginia Crab trees were scion rooted.

In Indiana (G. I. Mink & J. R. Shay, pp. 18–21) in 2 Purdue experimental orchards symptoms were found in 9 of 10 scion vars., Stayman Winesap being free and Virginia Crab (scion and stock) having severe pitting; in 900 6–8-yr.-old hybrid seedlings 16–90% showed symptoms among the different crosses. In limited indexing tests 5 symptomless trees induced symptoms on the indicators.

In British Columbia (F. W. L. Keane & M. F. Welsh, 2 papers, pp. 22–29) 27 apple and crab apple stock vars. were examined; visual symptoms were found in 6 and also in Golden Delicious scions on 3 of these. Preliminary indexing indicated that stem pitting is distinct from rubbery wood virus, both being present together in 3 trees. A virus from Rome Beauty caused stunting and decline in Virginia Crab.

J. G. Barrat, W. W. Smith, & A. E. Rich (pp. 8–12) found that stem pitting occurred in an experimental orchard in N. Hamp. in the stocks Virginia Crab, Florence Crab, and Red River Crab, and dapple apple [**37**, 587] in the vars. Cortland and McIntosh on several body stocks or rootstocks. It is suggested that dapple apple symptoms result from a complex of 2 viruses, each latent when alone, brought together by grafting in a single tree. G. I. Mink & J. R. Shay (pp. 13–17) report that at Purdue University, Lafayette, Indiana, the Russian var. R12740–7A and several of its seedlings proved valuable indicators of apple mosaic and stem pitting viruses. A new chlorotic leaf spot developed in these indicators when indexed from virus infected trees. Both chlorotic spot and stem pitting developed from 27 trees representing 23 vars.

H. W. Guengerich & D. F. Millikan (Mo. agric. Exp. Sta., 3 papers, pp. 30–36) report that the rootstock Spy 227 is a good indicator of stem pitting virus, on which it is sometimes lethal, and that *Malus floribunda*, *M. platycarpa* (B-39478), *Crataegus crus-galli*, *C. mollis*, and *Amelanchier* spp. developed foliage symptoms the season after inoculation, clones of the 1st 2 being particularly promising as indicators. The stocks K-14, K-18, K-24, *M. kitaika* (P.I. 107219), Canada Baldwin, Antonovka (Ottawa str. and zheltaia), Besseminka, and Charlamoff developed no pitting in 1–3 yr. after inoculation.

Byrde (R. J. W.). **A note on the control of brown rot of Apples by griseofulvin.**—*Plant Path.*, **8**, 3, pp. 90–93, 1959.

At Long Ashton Res. Sta., Bristol, Laxton's Superb apple trees were sprayed with 5 experimental fungicides, including griseofulvin at 0·1, 0·05, and 0·1% in 1956, 1957, and 1958, respectively. Several fruits on each tree were inoculated with *Sclerotinia fructigena* [cf. **34**, 158] 2–3 weeks before and the amount of subsequent infection was assessed by the artificial wounding of 5 fruits/tree, repeating this several times in Sept., and counting the no. of infected wounds 5 or 6 days after wounding. In the 3 yr. the griseofulvin treatment gave means of 21, 28, and 54% infected injuries, as against 76, 55·5, and 73% for the controls. Several of the other compounds, known to be toxic to the fungus, failed to give any control, and it is thought that the griseofulvin may have acted to some extent systemically.

Loughnane (J. B.) & McKay (R.). **Perithecial stage of Apple canker on current season shoots.**—*Plant Path.*, **8**, 3, p. 113, 1 fig., 1959.

In Jan. 1959 badly cankered shoots of Laxton's Superb apple trees were received at the Univ. Coll. Farm, Glasnevin, Dublin, bearing numerous perithecia of *Nectria galligena* [**37**, 4] in clusters in cracks and crevices in the bark and studded along the shoot.

Eid (R. F.) & Heuberger (J. W.). **Etiology of Botryosphaeria ribis on wood and fruit of the Rome Apple.**—Abs. in *Phytopathology*, **49**, 8, p. 523, 1959.

In Delaware *B. ribis* [**37**, 289; **38**, 266] causes wood cankers and fruit rot,

pycnidia and perithecia containing viable spores being produced on cankers throughout the year, with peak production 1 June 15 July. Opt. conditions for spore germination are 100% R.H. for several hr. and 77–86° F. Pycnidia also form on rotted fallen fruit. By inoculating the fruit or covering it at petal stage and exposing successive lots (200 fruit) at 15-day intervals the period of susceptibility was shown to last from June until Oct. harvest, and protective spray schedules should be timed accordingly, with special correlation with max. spore production.

Pepper (E. H.). **Northwestern Apple tree anthracnose reported from Michigan.** – *Plant Dis. Reptr*, **43**, 8, pp. 920–921, 2 fig., 1959.

Conidial *Neofabraea malicorticis* was present on apples submitted to Mich. State Univ., East Lansing, from Laingsburg; this constitutes the 2nd record of the disease in the Midwest [cf. **20**, 309; map 128]. In the orchard concerned Golden Delicious trees were cankered, but not MacIntosh or Jonathan.

Hunnam (D.) & Hey (G. L.). **Early picking can mean less storage rot.** *Grower*, **52**, 2, pp. 93, 95, 1959.

Apple samples from 2 sites, sprayed with captan at the end of July, late Aug., and mid Sept., or left unsprayed, were picked on 3 dates between late Sept. and early Oct. and half were sprayed with *Gloeosporium* [*Neofabraea*] *perennans* [**39**, 116] to ensure infection. The results indicated a significant effect of the picking date on the level of rot; greater age meant a longer period for lesion development, more inoculum available to fruit remaining longer on the trees, and increased susceptibility of riper fruit. The date of picking had little effect on the percentage control by captan at 1 site; at the other it was less in the late pickings. Thus early picking will give a lower infection level at the end of normal storage life, although inoculation indicated that late infection may not be as important as early. The protection afforded by captan was highly effective 8 days after application but not after 19 days.

Adams (R. E.) & Tamburo (S. E.). **A practical means of reducing storage rots of Apple and post-harvest rots of Peach.**—*Curr. Rep. W. Va agric. Exp. Sta.* 22, 12 pp., 6 graphs, 1959.

An account of experiments on fungicidal treatment of field boxes already noticed [cf. **38**, 704].

Zeiders (K. E.) & Fink (H. C.). **Studies on internal bark necrosis of Red Delicious Apples.**—Abs. in *Phytopathology*, **49**, 8, p. 526, 1959.

Internal bark necrosis [**34**, 602] developed on trees grown in a sand medium + modified Hoagland's solution with 50 p.p.m. Mn, or without B, or with 2, 3, or 5 p.p.m. Mn but no B; 250 p.p.m. NaCl did not induce symptoms. High concs. of Fe delayed but did not suppress symptoms induced by Mn toxicity or lack of B; 50 p.p.m. Fe applied as 'sequestrene (NaFe)' caused no macroscopic symptoms. Fe toxicity caused root rotting, rosetting, and stunting. Necrosis or hyperplasia of parenchyma throughout the periderm, cortex, pericycle, or phloem may be initial evidence of B deficiency or Mn toxicity in this var. The disease is not caused by excess Fe and is distinct from that on Jonathan apple reported to be due to high soil chlorides.

Semin (M. G.). Развитие микориз в связи с периодами роста корней Яблони. [The development of mycorrhiza in relationship to the growth periods of Apple tree roots.]—*J. agric. Sci., Moscow*, **4**, 8, pp. 153–154, 1959.

Microscope observations were made, starting in 1955, at the Irkutsk agric. Inst.

and elsewhere in the Irkutsk region, to determine the condition of the active part of the root system of reinette, semi-cultivated, and creeping forms of large fruit bearing apple trees grafted to Sibirka and Purple Reinette. Over 2,500 root strands were examined, sampled from 15 vars. at different depths every 10 days (Apr.–Nov.). The intensive development of mycorrhiza [cf. **36**, 597] was demonstrated, many vars. having typical smooth forms of simple and necklace mycorrhizas. The distribution, form, and relationship of the mycorrhizas vary in relation to the growth of the root. Usually mycorrhiza are devoid of root hairs, they have a smooth net surface, and a characteristic contraction at the base. The necklace type has clearly distinguished constrictions and flat tips. In Apr. (temp. 0·3–0·5° C.) growing points begin to develop as bright transparent tubercles. Many tubercles also develop at −3° which become mycorrhizas. As growth proceeds the colour changes from hyaline to bleached greyish though the tips remain hyaline during the whole growth period. Cessation of growth is characterized by bleaching of the tips. Seasonal changes correspond to the growth periods of the apple tree roots, so that they are a means of determining whether the root system is in an active or resting state. In the Irkutsk region the spring root growth begins in Apr., reaching a max. in May, and ending at the beginning of June. In the majority of the root systems there are many new growing points (tubercles), but there are none at the beginning of June and the tips gradually lose their lustre; in the resting period, they darken in colour and may break off. Partial or complete dying occurs at this stage. The summer root-growth period begins in July, continuing to the beginning of Aug; new growing points are seen in the mycorrhiza complex. The 3rd period begins in mid-Aug. and continues until the soil is frozen. In these 2 periods changes similar to those in the 1st period occur. In spring growing mycorrhizas constitute over 71% of the total number of tips; in the 2nd and 3rd periods they constitute only 30 and 45%. With insufficient soil humidity they become desiccated and rugose. They are well able to support temps. under 0° C. Soil cores with roots were placed in a refrigerator for 15–20 days at −6°, then allowed to thaw and the roots watered. Mycorrhiza of the Sibirka seedling were most resistant to freezing, retaining the bleached-grey colour and even the transparent tips. Other types of apple trees (also with Sibirka rootstock) in these conditions lost their bleached-grey colour and turned pale or dark brown. The av. distribution of mycorrhiza in the soil was 47% at 0–20 cm., 24·8% at 20–40 cm., 17·9% at 40–60 cm., and 9·5% at 60–80 cm. Roots appear to last for 4–5 yr., and then they die gradually.

Milbrath (J. A.). **Mechanical transmission of the virus responsible for Sour Cherry yellows, Prune dwarf, and Peach stunt.**—Abs. in *Phytopathology*, **49**, 9, p. 545, 1959.

A virus obtained from 6 trees with symptoms of sour cherry yellows [**38**, 531, 756] was bud-inoculated to peach seedlings and then transmitted from tip leaves of these to Buttercup squash, which developed bright golden chlorosis of varying severity, indicating strain differences, though a study of physical properties, host range, and seed transmission showed that only 1 virus was concerned. Isolates from each of the original sources were transmitted mechanically from squash to Mahaleb [cherry] seedlings, and thence budded to Shirofugen flowering cherry and Montmorency sour cherry, on both of which symptoms of stone fruit [peach] ring spot virus were obtained. Montmorency showed a chlorotic or necrotic ring spot shock reaction the 1st yr. and typical sour cherry yellows the 2nd. Early Muri peach developed severe stunt [loc. cit.] the 1st yr., and Italian prune developed dwarf [loc. cit.]. Thus sour cherry yellows, prune dwarf, and peach stunt are apparently caused by strs. of peach ring spot virus.

Mills (I. K.) & Afanisiev (M. M.). **Host ranges and latent carriers of Lambert mottle in Prunus species.**—*Plant Dis. Reptr*, **43**, 10, p. 1098, 1959.

In experiments at the Mont. agric. Exp. Sta., Bozeman, since 1956, of 17 *Prunus* vars. bud inoculated with Lambert mottle [cherry necrotic rusty mottle virus: **38**, 531] from a single Lambert cherry tree, only Lambert, Seneca, and Starking Gold Giant cherries developed symptoms. When the inoculated trees were indexed on Lambert all except Shiro-fugen, Montmorency, chokecherry [*P. virginiana*], and Italian prune reacted positively. It appears that many cherry vars., commercial and pollinators as well as common rootstocks, can carry the virus.

Schuh (K.). **Eine noch nicht identifizierte Virose des Pflirsichs.** [A so far unidentified virosis of Peach.]—*NachrBl. dtsch. PflSchDienst* (*Braunschweig*), *Stuttgart*, **11**, 6, pp. 92–93, 2 fig., 1959. [Engl. summ.]

From the Institut für Obstkrankheiten, Heidelberg, a description is given of a virosis observed on peach var. Kernechter vom Vorgebirge on Brompton rootstock near Heidelberg in 1956. The leaves exhibited a light green speckling. Peach seedlings inoculated from this source developed characteristic symptoms; in June 1958 the oldest leaves were chlorotic and in some the veins and partly also the interveinal areas had become distinctly red. The next leaves showed a reddish brown to violet spotting on a green ground, and those above a light green spotting seen against the light, which also appeared faintly on leaves at the shoot tips. The spots were sometimes ring-shaped or arranged in rings. Leaf fall had already started at the base of the shoot. In addition, leaves were found with green to grey-green spots on a red or yellow ground, and with dark green spots on light to yellow-green. Towards the end of the growing period a peculiar violet pattern appeared on the tip leaves. The virus, which is graft-transmissible, appears to be closely related to peach asteroid spot virus and peach purple mosaic virus [**37**, 586].

McClure (T. T.) & Smith (W. L.). **Postharvest decay of Peaches as affected by temperatures after hydrocooling in water or dowicide A solutions.**—*Phytopathology*, **49**, 8, pp. 472–474, 1959.

In further studies at Beltsville [cf. **37**, 668] peaches inoculated with *Monilinia* [*Sclerotinia*] *fructicola* and *Rhizopus stolonifer* were cooled 2 hr. later by submersion for 15 min. in ice water with or without 0·1% dowicide A and subsequently held at 40–60° F. (5° range) for 3 days and then at 75° for 3 or 6 days. Rot by both fungi after 3 days at 75° was less in fruit held first at 40° than at 60°; after 6 days brown rot was the same throughout, regardless of early holding temps., but *Rhizopus* rot was still less in the lower cooled fruit, apparently because of some factor having a permanent effect on either the virulence of the pathogen or the conditions for infection. Dowicide A reduced both rots, but less effectively after holding at 60° than at 50° or below.

Fulton (R. H.) & Veenstra (M. A.). **Heat-treatment studies on the shoestring virus present in the Jersey highbush Blueberry variety.**—Abs. in *Phytopathology*, **49**, 9, p. 539, 1959.

Cardinal temp. ranges for treatment of dormant [*Vaccinium*] hardwood cuttings infected by shoestring [**36**, 706] were 35, 40, and 45° C. at periods of 5–30 min. at 5 min. intervals, and 30–180 min. at 30 min. intervals; 50° for 1–5 min. at 1 min. intervals, and 6–30 min. at 2 min. intervals; 52 and 54° for ½–5 min. at ½ min. intervals; and 56, 58, 60, and 62° for ¼–3 min. at ¼ min. intervals. Treatments at 60° above 1½ min. and at 62° above 1 min. were lethal. There was apparently no correlation with time interval.

Krivin (B. G.) & Averina (Mme L. I.). О вирусных болезнях Земляники и методе оздоровления её рассады. [On virus diseases of Strawberries and a

method for curing seedlings.]—Консерв. Овощ. Пром. [*Konserv. Ovoshch. Prom.*], **14**, 8, pp. 31–35, 5 fig., 1959.

Recently a few strawberry plants with virus symptoms were detected among the collection of imported vars. at the quarantine nursery at Krasnodar State farm. The majority of the affected plants were var. Ville de Paris; symptoms were especially noticeable in 2-yr.-old plants. Mild crinkle and crinkle symptoms were later found in strawberry fields in the Chechen-Ingoushskiĭ, Krasnodar, Tul'ski, and Krasnogorodsk districts, U.S.S.R. Esterhazy was also affected. In diseased Ville de Paris the growing period was only 60 days compared with 100 for healthy plants. At a constant temp. of 37° [C.] and R.H. of 90–95% for 14 days 40 potted plants of Komsomolka and Ville de Paris with virus symptoms were noticeably weak after treatment. They were left to recover in the glasshouse before transplanting to the field. During the summer they developed normally. Komsomolka seedlings heat treated in June developed runners in Aug. It was established that early heating can ensure healthy transplantings with increased yield.

Stembridge (G.) & Scott (D. H.). **Inheritance of resistance of Strawberry to the common race of the red stele root rot fungus.**—*Plant Dis. Reptr*, **43**, 10, pp. 1091–1094, 1959.

At Md agric. Exp. Sta., College Park, seedling strawberry progenies and asexually propagated plants of the vars. used as parents were grown in the greenhouse in soil infested with race A-1 of *Phytophthora fragariae* [**37**, 728]. Resistance, evaluated from the percentage of the root system with red stele, was shown to be partially dominant and quantitatively inherited. Aberdeen type resistance was transmitted to approximately ¼ of the progeny when a resistant parent was crossed with a completely susceptible one. Aberdeen and Frith types of resistance appeared to be transmitted independently, the cross of 2 resistant plants yielding twice as many resistant seedlings as that involving only 1 resistant parent.

Calpouzos (L.), Theis (T.), Brun (W. A.), & Colberg (C.). **A micro-spray technique for evaluating low-volume oil-based sprays for disease control on single Banana leaves in the field.**—Abs. in *Phytopathology*, **49**, 9, p. 535, 1959.

To evaluate oil sprays against *Mycosphaerella musicola* [**38**, 534] an artist's airbrush is connected by hose to a regulator valve on a tank of compressed air and spray oil delivered to the brush by a pipette inserted in the fluid intake, giving spray rates accurate to 0·01 ml. and comparable with amounts applied on a commercial scale. The oil is directed to the leaf surface by a cloth covered shield.

Khan (A. H.). **Some diseases of Colchicum luteum Baker.**—*Pakist. J. For.*, **9**, 1, pp. 79–81, 8 fig., 1959.

In W. Pakistan the author collected spores of *Urocystis colchici* from the dried, papery tunic scales buried with the corm. At this stage the new leaves were still unaffected, indicating that the smut overwinters on the bases of the shrivelled foliage.

Severe attacks of *Uromyces colchici* occurred from Mar.–May during a 4-yr. observation period in the Murree Hills and at Abbotabad. The pycnia (not mentioned by Ulbrich [**18**, 59]) and aecidia are described. The perfect state did not develop.

Mathur (R. S.) & Sinha (R. P.). **Control of foot rot of Pan, Piper betle L., in Uttar Pradesh.**—*Plant Prot. Bull., New Delhi*, **8** (*1956*), 2, p. 17, 1959.

In several districts of Uttar Pradesh *P. betle* was attacked by leaf spot [*Fusarium semitectum*: **36**, 212] which begins on the leaves and spreads to the stems, killing the whole shoot, and also a foot rot [*Phytophthora parasitica* var. *piperina*: **35**, 125].

Spraying with 0·3% perenox decreased diseased vines to 2·3% compared with 71·6% in untreated plots sown with this crop for a 2nd yr. in succession, after a 2 yr. fallow. (The 1st yr. there was only 5·1% infection).

Pandalai (K. M.), Sankarasubramoney (H.), & Menon (K. P. V.). **Studies on soil conditions in relation to the 'root' and 'leaf' diseases of the Coconut Palm in Travancore-Cochin. Part V. Exchangeable cations, cation exchange capacity and pH of Coconut soils.** *Indian Cocon. J.*, **11**, 3, pp. 87–97, 1958.

Further work at the Central Coconut Res. Stas., Kasaragod and Kayangulam [**38**, 761], indicated that the sandy, alluvial loam, and red loam soils from localities with healthy palms have higher pH values, exchangeable cations, and percentage base saturation than corresponding soils from diseased areas [cf. **33**, 293]; the significant differences between healthy and diseased of all 3 types indicate a positive correlation with disease incidence. The effect of soil waterlogging and the consequent increase in total soil acidity have been noted [**33**, 294]; it is concluded that there is an urgent need for regulated liming of coconut soils (especially in diseased areas).

Robertson (J. S.). **Blast disease of the Oil Palm: its cause, incidence and control in Nigeria.**—*J. W. Afr. Inst. Oil Palm Res.*, **2**, 8, pp. 310–330, 4 pl., 2 graphs, 1959. [20 ref.]

Some of this information on blast disease of oil palm seedlings has been noticed [cf. **38**, 327 *et passim*]. The 1st symptom is the disappearance of the normal gloss of healthy leaves, which become dull and flaccid, khaki or olive-green, later greenish-yellow or clear yellow, eventually with terminal purple or umber tints. Finally, the lamina dries, becoming dark brown and brittle. The leaf tissue surrounding lesions caused by *Cercospora* [*elaiedis*] remains green. Most affected seedlings also develop a necrosis of the central spear leaf, which may either appear at the tip or may affect only the basal tissues of the spear, which become partially necrotic. This basal spear rot, with which a *Fusarium* sp. is associated, can affect the whole of the unopened leaf and destroy the growing point of the seedling.

In seedlings with even slight leaf symptoms the root system is already in an advanced state of decay [cf. **38**, 158]. Root infection occurs at the tips of the fleshy primary roots. In L.S. the transition zone between healthy and diseased tissues is in the cortex. The necrosis which destroys the root cortex never invades the bulb tissue. Sclerotia of *Rhizoctonia lamellifera* are present all over the central strand of the naked stelar tissue left after the destruction of the cortical and hypodermal tissues. Blast is fatal to about 95% of seedlings which develop leaf symptoms; those which recover are too stunted and reduced in vigour to be of use for field planting.

From 1954–57 *R. lamellifera* and a *Pythium* (probably *P. splendens*) [loc. cit.] began to appear quite regularly in isolations from diseased root tissue [**37**, 366]. In the transition zone in primary root infections by *Pythium* the hyphae grow intracellularly. As *R. lamellifera* becomes active it advances intercellularly along the root. The *Pythium* sp., which is the primary pathogen, can penetrate healthy, undamaged roots, and induce a total necrosis of the cortical tissues but the rate of growth within the host is less than that of *R. lamellifera*. There is evidence of a definite relationship between parasitism by *Pythium* sp. and the physiological state of the host tissue.

The leaf symptoms may be a combination of reaction to a toxin and the drying-out of the leaf tissue. The toxin is produced by the *Pythium* and possibly by secondary organisms associated with the disease; it is possible to reproduce the purplish-brown discoloration of the leaf tips by immersing the cut ends of petioles

of healthy, detached leaves in a water extract of the roots of 'blasted' seedlings. The sharply defined time of attack of the disease probably results from the operation of a complex of environmental factors on both host and parasite. Nutrition clearly plays an important part in the host–parasite relationships. In years when incidence is high, losses of 20–50% are not uncommon.

Bull (R. A.) & Robertson (J. S.). **The problems of 'little leaf' of Oil Palms—a review.**—*J. W. Afr. Inst. Oil Palm Res.*, **2**, 8, pp. 355–375, 1 diag., 1959. [37 ref.]

This is a comprehensive review of the literature to the end of 1958 on the disease [cf. **37**, 674 *et passim*] under the main headings: nomenclature; geographical distribution and economic importance; symptoms of the spear rot–little leaf complex; cause; effects of age, genetic constitution, and environment on susceptibility to the spear rot–little leaf complex; and spread.

On the basis of the evidence discussed it is proposed to subdivide the symptoms into 2 main groups. In the spear rot-little leaf complex the primary symptom is a rotting of the central spear, which usually collapses and dies, the rot spreading to the upper part of the bud which may die. The tree usually recovers and the production of 'little' leaves after spear rot is, therefore, a symptom of recovery from the non-fatal rotting of the bud tissues. If the rotting is sufficiently extensive, the bud is killed and the palm dies. In the hook leaf little leaf complex, on the other hand, the primary symptom is the production of 'hooked' leaflets and then of 'little' leaves, which become progressively smaller as severity increases; rotting of the spear is absent or negligible, and the 'little leaf' symptom is a primary symptom of disease, not recovery. This latter complex may be provisionally ascribed to B deficiency, but the cause of the other complex remains as yet unknown.

In hook leaf little leaf recovery may occur or, if the deficiency is graver, a fatal bud rot may develop. If the bud is not killed, recovery-type 'little' leaves are produced which differ in origin from those forming in the earlier stages of the disease.

Wenzl (H.) & Glaeser (Gertrude). **Untersuchungen über den histologischen Nachweis von Fadenkeimigkeit und Blattroll in Kartoffelknollen.** [Studies on the histological diagnosis of spindle sprout and leaf roll in Potato tubers.]—*PflSchBer.*, **22**, 1–3, pp. 1–30, 1 fig., 4 graphs, 1959. [Engl. summ.]

Investigations at the Bundesanstalt für Pflanzenschutz, Vienna, on over 120,000 potato tubers confirmed that the spindle sprout associated with [tomato] stolbur virus infection [**38**, 538] can be diagnosed before germination by the callose test with reso blue [**35**, 540; **38**, 329] with a greater degree of certainty than can leaf roll virus infection. The difference was more pronounced in sections from the crown and middle region of the tuber than in those from the heel. Fuchsin and phloroglucinol-HCl were less efficient than reso blue for diagnosing leaf roll but gave equally good indication of spindle sprout in heel and middle sections. Spindle sprout causes more pronounced callosing and phloem necrosis than leaf roll. The percentage of correctly diagnosed tubers, especially diseased ones, can be raised by following the reso blue treatment with the fuchsin (more effective) or phloroglucinol test.

Spindle sprout, and to a lesser extent leaf roll, can sometimes be identified without staining; thus, in Sieglinde phloem necrosis is recognizable in advanced stages of infection. Such observation should only be used to supplement the callose test in heavily infected material and then only provided necrosis is very pronounced.

Weak plants or those producing only 1–2 stems commonly develop from tubers giving a positive staining reaction; this probably represents a partial or mild form of spindle sprout.

Hooker (W. J.) & Kim (W. S.). **Inhibitors of Potato virus X in leaves of Potatoes with different types of resistance to the virus.**—Abs. in *Amer. Potato J.*, **36**, 8, pp. 295–296, 1959.

Inhibitors of potato virus X in potato vars. with tolerant, hypersensitive, and immune reactions were demonstrated by a local lesion test on *Gomphrena globosa*: when leaf sap of the former was spread on the upper leaf surface of the latter before inoculation the resulting infection was reduced to about 35% of that in controls. There were no statistically significant differences between the saps of the different vars. Infection was unimpaired when the sap was applied after inoculation, even when the interval was only 1 min. When the virus was mixed with leaf sap the infectivity of the mixture fell during an 8-day observation period: again there was no difference between the various sap samples.

The inhibitors were most conc. in crude sap and in the supernatant following centrifugation at 7,000 g. for 15 min., but were hardly detectable in the final precipitate after heating at 55° C. for 10 min. and a 2nd centrifugation. The unheated precipitate and the heated supernatant were intermediate in their inhibitory activity. It is postulated that the inhibitor affects the virus more directly than it does the host test plant.

Webb (R. E.) & Schultz (E. S.). **The evaluation of Potato seedling varieties for field immunity from Potato virus A.**—*Amer. Potato J.*, **36**, 8, pp. 275–283, 6 fig., 1959.

In this method, developed at Beltsville, Md, plants of seedling vars. selected from field immune parents are inarch-grafted with virus A-infected plants of Seedling 41956, to eliminate from further tests those that react by top necrosis, betokening field immunity (cf. MacLachlan *et al.*, *Res. Bull. Wis. agric. Exp. Sta.* 180, pp. 1–36, 1953). About 35 days after grafting, subinoculations are made from mottled or symptomless plants to the indicator *Solanum demissum* [cf. **35**, 119] which permits detection within 4–6 days of all seedling vars. susceptible to virus A. These are replanted and at 1–2 in. subjected to infestation with 25–50 virus A-infected *Myzus persicae* for 24 hr.: 30–35 days later they are subinoculated to the indicator. Seedling vars. not infected by aphid inoculation are considered field immune from virus A [**38**, 536].

Thomson (A. D.). **Potato viruses A and S in New Zealand.**—*N.Z. J. agric. Res.*, **2**, 4, pp. 702–706, 2 fig., 1959.

At the D.S.I.R., Lincoln, N.Z., potato virus A was identified in the potato vars. Arran Chief and Aucklander Short Top, *Lycopersicon pimpinellifolium* proving the best test plant. Virus S was identified serologically in Aucklander Short Top, Arran Banner, and Dakota.

Jensen (J.). **Forsøg med tidlige brokimmune sorter af Spisekartofler 1955–57.** [Experiments with early wart-immune varieties of table Potatoes 1955–57.] — *Tidsskr. Planteavl*, **63**, 1, pp. 61–76, 1 fig., 1959. [Engl. summ.]

Particulars are given of the culinary properties of Primula, Tylstrup 48347 and 48271, Doré, Sirtema, Sommerkrone, and Eva, immune from wart disease [*Synchytrium endobioticum*] in Denmark.

Grechushnikov (A. I.) & Yakovleva (Mme N. N.). Реакция Картофельного растения на заражение грибом-возбудителем рака Картофеля и его токсические вещества. [The reaction of the Potato plant to infection by the fungus causing Potato wart and its toxins.]—Биохим. Плод. Овощ. [*Biokhim. Plod. Ovoshch.*], *1959*, 5, pp. 147–158, 5 fig., 1959.

Anatomical studies at the Potato Res. Inst. and the All Union Res. Sta. for Potato

Wart, showed that when zoospores of *Synchytrium endobioticum* [**38**, 616] infect tubers of resistant plants, the cells penetrated quickly die, forming a defence necrosis, which not only impedes further development but also leads to the destruction of the fungus, which is a strict biotroph. In etiolated tuber sprouts of resistant inoculated vars., besides the formation of necroses, there is a temporary change in the sprouts; they thicken considerably as elongation is checked. In plasmolysed cross-sections of sprouts infected by zoospores and stained with neutral red, cell reactions could be clearly seen. The enhanced cell division and abnormal growth of tissues of susceptible plants do not occur under the influence of complementary auxin type stimulators; they result from the action of toxins secreted by *S. endobioticum* in the course of development, or arise from changed metabolism in the infected tissues. Peroxidase activity in sprouts develops quickly under the influence of infection, and more so in resistant than in susceptible vars. Tyrosinase activity is greatly increased in wart tumours on sprouts and tubers. The action of a glycerin extract of warts (1 part residuum of an alcohol extract and 5 parts glycerin) and of lanolin paste containing the toxins on etiolated sprouts induced elongation of the cells in resistant vars. until they exceeded normal cells by 1·5–2 times; the cells then divided. Only very slight expansion and division occurred in susceptible vars. The use of such cell reactions for diagnosing resistance enabled 20 numbered vars. to be correctly appraised. In a determination of wart resistance of hybrids (527 lines) of different ages and origins by means of cell reaction to wart toxins, 70·6% of the results coincided with those obtained by the direct infection method. The infiltration into potato leaves of a boiled and filtered extract from warts caused an increase in respiration which must be regarded as a defence reaction to the introduction of toxins.

Lipsits (D. V.). Содержание серы глютатиона и аскорбиновой кислоты в пораженном раком картофеле. [The glutathione sulphur and ascorbic acid content of wart affected Potatoes.] —*Biochemistry, Leningr.*, **23**, 4, pp. 592–600, 1 pl., 1958. [Engl. summ. Received Nov. 1959.]

When 3 potato vars. resistant to wart (*Synchytrium endobioticum*) [see above] and 5 susceptible were grown in infested soil or inoculated by contact with fresh wart-infected pieces at the Union Res. Sta. of Potato Wart, Chernovzy, U.S.S.R., distinct shifts in the metabolism of S-containing compounds and participation of SH-groups in the formation of wart neoplasm were observed. More S^{35} accumulated in the neoplasms than in normal tissues and there was an increased amount of ascorbic acid in the vigorously growing meristematic tissues of the neoplasm.

20-day forecasts of late blight being made experimentally. —*Amer. Potato J.*, **36**, 8, p. 306, 1959.

On an experimental basis, 20-day forecasts of late blight [*Phytophthora infestans*] are now being sent by the U.S. Dept Agric. to co-operators in 11 north-central States; next season they are expected to be generally released, replacing the 7-day forecasts [**35**, 318; **38**, 26] in routine use since 1952.

Choudhuri (H. C.) & Pal (S. C.). **Forecasting late blight of Potatoes in the hills of West Bengal.**—*Amer. Potato J.*, **36**, 8, pp. 284–287, 2 graphs, 1959.

There is considerable variation in the time of appearance of late blight (*Phytophthora infestans*) in W. Bengal [cf. **35**, 120; **38**, 158, 273]. Studies by the agric. Dept, Govt of W. Bengal, Calcutta, of the climatological data and blight incidence for 1952–58, based on Hyre's moving graph method [cf. above], but using a 7-day total rainfall period, which proved more suitable than Hyre's 10-day period, showed that forecasting would have been successful in 6 of 7 yr. in the Darjeeling Hills. (The av. total rainfall for 10 days in Darjeeling is 2·6 in. and for 7 days, 1·82 in.).

Raeuber (A.). **Kritische Tage und Krautfäuleauftreten an Kartoffeln in England und Mecklenburg 1950–1955.** [Critical days and occurrence of Potato blight in England and Mecklenburg 1950–55.] *Angew. Meteorologie*, **3**, 2, pp. 47–51, 1 diag., 1957. [Received 1959.]

This is a detailed comparison made at the Agrarmeteorologische Forschungsstation, Groß-Lüsewitz, Kr. Rostock, E. Germany, of weather conditions in England [**37**, 553] and Mecklenburg [**36**, 782; **38**, 273] over 6 yr. (1950–55) and their relationship to outbreaks of potato blight (*Phytophthora infestans*) [cf. below]. In Mecklenburg the dominating influence of the synoptical weather conditions was unmistakable.

Raeuber (A.). **Untersuchungen zur Witterungsabhängigkeit der Krautfäule der Kartoffel im Hinblick auf einen Phytophthora-Warndienst.** [Study on the relation of weather to Potato blight in regard to a *Phytophthora*-forecasting service.] *Abh. met. hydrol. Dienst dtsch. dem. Repub.*, **6**, 40, pp. 1–38, 3 fig., 1 diag., 4 graphs, 1 map, 1957. [57 ref. Received 1959.]

This detailed review of the literature covering the meteorological factors governing outbreaks of potato blight [*P. infestans*: cf. above] includes a critical examination of existing forecasting systems, with particular regard to an improvement in the establishment of a 'zero-time' with the help of phenological data, and analyses of spore-trappings in Gross-Lüsewitz in 1953–4 [**39**, 35].

Darozhkin (M.) & Ramnëva (Mme Z.). Нарабўнанне вірулентнасці розных папуляцый **Phytophthora infestans (de Bary)** на бульбе. [Investigation of the virulence of different populations of *P. infestans* in Potatoes.] Вес. Акад. Нав. Минск [*Ves. Akad. Nav. Minsk*], Ser. Biol. Sci., *1958*, 4, pp. 31–36, 1959.

In 1957 at the Phytopath. Sect., White Russian agric. Inst., Minsk, 40 strs. of *P. infestans* [cf. **39**, 35] from different parts of U.S.S.R. were tested on 100 potato vars., both susceptible and resistant, by inoculation with a spore suspension at the base of the leaves. Strains were classified according to virulence: slight, 25% infection but no sporulation; medium, 50% infection; and highly virulent, strs. 28, 33, 36, and 40. Pathogenicity of all the strs. was also tested on 14 other non-tuber-forming Solanaceae, mainly vegetables; only 3 strs. proved slightly virulent.

Physiologic races in White Russia are somewhat different from those described from other countries and are much more virulent to practically all potato vars. than strs. from other parts of U.S.S.R., most being classified in the very virulent group.

Bonde (R.), Akeley (R.), & Merriam (D.). **Late blight resistance of selected Potato seedlings highly resistant to ring rot.** *Plant Dis. Reptr.*, **43**, 8, pp. 924–928, 2 fig., 1959.

In tests by the Maine agric. Exp. Sta. and the U.S. Dept Agric. 4 seedlings (B 3879-3, B 3686-1, B 3201-38, and B 4157-1) resistant to ring rot (*Corynebacterium sepedonicum*) [**38**, 541] also proved to be resistant to *Phytophthora infestans* in a field where conditions favoured tuber infection. Kennebec and Cherokee, though resistant to *P. infestans* race 0, are susceptible to tuber decay induced by race 1, and would need to be sprayed in a bad blight season. Sebago showed a high degree of field resistance and developed no tuber rot.

Rubin (B. A.), Metlitskiĭ (L. V.), Sal'kova (Mme E. G.), Mukhin (E. N.), Korableva (Mme N. P.), & Morozova (Mme N. P.). Использование ионизирующих излучений для управления покоем клубней Картофеля при хранении. [The use of ionizing irradiations for the regulation of the dormancy

of Potato tubers in storage.]—Биохим. Плод. Овощ. [*Biokhim. Plod. Ovoshch.*], *1959*, 5, pp. 5–101, 3 pl., 19 fig., 17 graphs, 1959. [113 ref.]

As part of this study the effect of γ-rays from Co 60 on tuber resistance to *Phytophthora infestans* and *Fusarium* spp. was investigated at the A.N. Bach Inst. Biochem., U.S.S.R. Acad. Sci. A 20-day culture of *P. infestans* on oatmeal agar and slices of potato var. Lorkh were irradiated the day after the appearance of aerial mycelium (6–7 days after inoculation). At 10 Kr (1 Kr = 1,000 roentgen) the growth rate of the fungus was almost halved and stopped completely within 7 days. With 20 Kr growth rate was reduced to $\frac{1}{3}$ and stopped within 6 days; 100 Kr practically killed the fungus immediately. Transplants of conidia from an irradiated culture were made 12 days after irradiation. Those taken from the 10 Kr irradiated slope developed a mycelium identical with that of the control; from the 20 Kr, growth was depressed, the mycelium resembling a hardly noticeable greyish down; at 100 Kr the conidia were apparently killed. Conidia from mycelium of a monospore culture of *Fusarium* sp. were apparently not affected by 10 Kr.

Tubers irradiated at 10 Kr, inoculated by immersion in a mycelial suspension of *P. infestans*, and then placed in damp air at room temp. (15–18° C.) became more heavily infected than unexposed. The growth of *P. infestans* was more rapid on irradiated slices than on unexposed. With increased doses growth was raised and rotting of the substratum was brought about more speedily. Resistance of tubers to *P. infestans*, therefore, is weakened by ionizing irradiations. Tubers exposed to 10 Kr in the autumn, placed in lath boxes (10 kg. capacity) in an unchilled store (temp. 1·5° in winter, *circa* 6° in spring, and up to 15° in the summer) were not different from unirradiated in resistance to *Fusarium* in the spring, but the irradiated lasted well until August without sprouting. The poor state of tubers already weakened by unfavourable storage conditions was enhanced by irradiation. The resistance of tuber slices inoculated with mycelium of *Fusarium* sp. (7-day growth) was reduced. Irradiated and unexposed tuber slices kept at 20° for 4 hr. were less strongly infected by *Fusarium* sp. than slices at 4°; this effect was still more noticeable after 10 days.

Since some fungi, including *Fusarium*, penetrate the tuber only through damaged parts of the tissue, it was important to examine the effect of radiation on wound healing. Irradiation of tuber slices at 10 Kr had no depressing effect on peroxidase activity or wound biosynthesis of ascorbic acid and none on suberin formation, but periderm formation was noticeably depressed; even after 20 days at 20° (the opt.) no wound periderm was formed. Tubers immediately after irradiation are more easily infected than unexposed, but 5 months afterwards there is no difference; thus, resistance, which is depressed by irradiation, is gradually re-established; the lower the dose, the less resistance is depressed and the quicker it is re-established.

Gomolyako (L. G.). Влияние заболевания ооспорозом на химический состав клубней Картофеля. [The effect of oosporosis disease on the chemical composition of the Potato tuber.]—Биохим. Плод. Овощ. [*Biokhim. Plod. Ovoshch.*], *1959*, 5, pp. 159–164, 1959.

Oospora pustulans [**38**, 334] and *Spondylocladium* [*Helminthosporium*] *atrovirens* were determined at the Arctic exp. Sta., All-Union Inst. of Plant Breeding, as the causal agents of 'black skin', observed since 1937 and of frequent occurrence in the Murmansk region on tubers in store. In 1951 and 1952 tubers of the vars. most extensively stored, Snezhnika No. 3, Imandra, Pilot, and Murmanskiĭ, infected by *O. pustulans* were shown to contain less starch, protein, and ascorbic acid, and more monosaccharides. Chemical differences were greater in those planted in iron podzol soil and less in those in peat bog soil, and were greater in Pilot and Imandra than in Snezhnika No. 3, while in Murmanskiĭ they were slight.

KRANZ (J.). **Einfluß der Vortemperatur auf die Erkrankungsdisposition der Kartoffelknolle für Phoma foveata Foister.** [Influence of pre-temperature on susceptibility of the Potato tuber to *P. foveata*.]—*NachrBl. dtsch. PflSchDienst* (*Braunschweig*), *Stuttgart*, **11**, 5, pp. 69–71, 3 graphs, 1959. [Engl. summ.]

In further work [**39**, 122] at the Institut für Pflanzenkrankheiten, Univ. Bonn, susceptibility of var. Olympia increased when the pre-temperature (for 28 days before wound inoculation) was raised from 4 to 26° C., and when exposure at 25° was prolonged from 0 to 28 days [cf. **38**, 539]. Susceptibility following treatment for 28 days at 25° diminished within 10 days of returning the tubers to 5°.

HILDEBRAND (E. M.). **Sweet Potato ringspot virus associated with internal cork virus.**—Abs. in *Phytopathology*, **49**, 8, p. 524, 1959.

A bushel lot (from a series) of Unit I Porto Rico sweet potato roots (Johnstone str. 2), obtained from Georgia in 1955, yielded a ring spot virus apparently free from internal cork virus [**38**, 161, 334]. This was the only clone of 30 from 23 States free from root symptoms after 5 months' warm storage, remaining cork-free after cultivation in 1956, though there were still foliage symptoms. Since all other Unit I Porto Rico material had both root and leaf symptoms it was assumed that this virus complex consisted of an innocuous ring spot virus and the internal cork virus, the latter causing both root and leaf spot symptoms. Use of sweet potato seedlings and morning glory [*Ipomoea* sp.] as indicators confirmed this.

MARTIN (W. J.). **Reaction to the Sweet Potato internal cork virus of 6 species of Convolvulaceae.**—Abs. in *Phytopathology*, **49**, 9, p. 545, 1959.

The virus [see above] was graft-transmitted to *Ipomoea lacunosa*, *I. nil*, and *Quamoclit coccinea*, and similarly back to Porto Rico sweet potato. Grafts to *I. hederacea*, *I. pandurata*, and *I. trichocarpa* failed to transmit the virus.

LORBEER (J. W.). **Control of soil pox of Sweet Potato in California.**—Abs. in *Phytopathology*, **49**, 9, p. 544, 1959.

This was effected in sandy loam by preplant tractor injection of chloropicrin, 10–15 gal./acre, which gave good control of *Streptomyces ipomoeae* [**38**, 384], 7 gal. being satisfactory. An immediate 2 in. water seal was advantageous. Chloropicrin at 45 gal./acre gave effective 2nd-yr. carry over control, but not at 10–15 gal. An initial preplant fumigation with chloropicrin at low dosage followed by an autumn soil application of S (500–750 lb. acre) for the 2nd yr. crop appeared promising, though S alone was not satisfactory.

NEWSAM (A.). **Pathological Division.**—*Rep. Rubb. Res. Inst. Malaya, 1957*, pp. 53–58, [1959.]

In this report [cf. **38**, 623] it is stated that studies on the slow spread of white root disease (*Fomes lignosus*) [cf. **38**, 335] of rubber indicated the need for a material to prevent external growth of root parasites on the roots. Fructifications of the 3 major root disease fungi, *F. lignosus* [*F. noxius*, and *Ganoderma pseudoferreum*] are being studied taxonomically. Sodium arsenite applied as a paste after ring barking does not differ greatly from butyl 2,4,5-T, brushed on to intact bark, in its effect as a stump and tree poison, but the addition of boric acid to 2,4,5-T gave a much more rapid kill and earlier decay. It was estimated that in old rubber trees, felled after poisoning and soon covered by creeping legumes, 20% of the wood was broken down to humus in 1 yr., and 60% in 2, mostly owing to fungal attack. A study of pink disease [*Corticium salmonicolor*: **38**, 32, 623] is in progress. Repeated attempts to bring about infection by spore inoculation have failed, even on the highly susceptible clone RRIM 501. Increase in the level of N fertilizer in clonal trials increased incidence.

In fungicidal tests against bird's eye spot [*Helminthosporium heveae*: cf. **37**, 506] the mean wts. of plants harvested from $\frac{1}{12}$ acre plots sprayed weekly with 50 g. material in 10 l. were: mercurized Cu oxychloride (MCO), 114 g., perenox, 90 g., zerlate, 88 g., phelam, 79 g., and parzate, 74 g., a difference of 12·6 g. being significant at the 5% level. Trifungol and triscabol, successful in Indonesia [**38**, 624], were also tested. At the end of the year only MCO had brought about any marked reduction in the disease. Plants were also fogged with the commercial oil-soluble Cu fungicide 'schlofog', a method considered to be promising.

Saccas (A. M.). **Une grave maladie des Hévéas des terres rouges en Oubangui-Chari.** [A serious disease of *Hevea* in red soils in Ubangui-Chari.]—*Agron. trop., Paris* (formerly *Nogent*), **14**, 4, pp. 409–458, 22 fig., 3 graphs, 1959. [Engl., Span. summ. 76 ref.]

A detailed account is given of a study at the Lab. Phytopath., Sta. Cent. Boukoko, of a disease which in May 1956 affected 2–5-yr.-old *Hevea* rubber trees growing in the forest area of the Region of Lobaye (M'Baiki); 280 ha. were affected, the most severely attacked clone being SAF 1 (105·6 ha.).

Very heavy fall of young leaves occurred, particularly those forming at the ends of young shoots. The symptoms resembled those of anthracnose, usually attributed to *Colletotrichum heveae* [cf. **36**, 513] and *Gloeosporium alborubrum* [cf. **32**, 588]. The disease had been noticed in 1952 in the same plantation, but then no damage of economic importance had resulted.

On the necrotic lesions on the leaves and branches acervuli of the *Gloeosporium* type were most numerous in very wet periods, whereas acervuli of the *Colletotrichum* type were dominant in less rainy periods. From this it was concluded that one species was implicated.

On any one medium (of various media used) both were morphologically identical. The acervuli in most were hairless and sticky, ones with hairs appearing on older cultures. The conidia were identical, as were the perithecia with asci and ascospores of *Glomerella cingulata*; the conidial form was identified as *C. gloeosporioides* (syn. *C. heveae*).

Inoculations of *Hevea* rubber leaves with conidia of the 2 fungi gave identical symptoms. As attempts to infect *Robusta* coffee and cacao plants experimentally were unavailing, the fungus is considered to be a biological form for which the name *C. gloeosporioides* f. [sp.] *heveae* is proposed.

Laboratory tests with 11 fungicides showed that all, at normal dosages, inhibited conidial germination. Further tests were then made on rubber seedlings growing in containers (21 plants in each), treatment being followed by inoculations 3 hr., 10 days, and 30 days later, other plants receiving 1 infection followed by 3 treatments. The best results were given by zerlate and fermate (each 0·25% at 2·5 kg./ha.); 3 treatments/month are recommended.

Twenty-fifth Annual Report of the British West Indies Central Sugar Cane Breeding Station, Barbados, for the year ending September 30th, 1958.—44 pp., 4 pl., [? 1959].

In a trial at Edgecumbe Plantation (pp. 24–25) hot water treatment (50° C. for 2 hr.) of B. 37161 and B. 41211 stock, as a precaution against ratoon stunting [virus: **35**, 844], increased arrowing from 4 (untreated) to 38% with a consequent reduction in yield.

Sturgess (O. W.). **Transmission of chlorotic streak disease.**—*Cane Gr. quart. Bull.*, **23**, 2, pp. 42–44, 3 fig., 1959.

Experiments were initiated at Meringa and Brisbane to determine the role of drainage water and the root system in transmission of the disease [**37**, 309]. In

the 1st experiment transmission was obtained when healthy and diseased sugarcane plants were grown in pairs in individual containers using nutrient solutions or gravel culture. In a 2nd experiment healthy and diseased shoots were again paired, but each in separate containers, the respective soil solutions being interchanged every other day. Positive results were again obtained, indicating spread of the virus independently of direct root contact cf. [**39,** 39].

Singh (G. R.) & Forbes (I. L.). **Development of red rot in a Sugarcane plant.**—Abs. in *Phytopathology*, **49**, 9, p. 551, 1959.

A latent-type bud infection is common in seed pieces planted in Louisiana. *Physalospora* [*Glomerella*] *tucumanensis* [**38**, 32] can be isolated from leaf sheaths, leaf scars, and buds of developing shoots but no midrib symptoms appear in the field for 4 or 5 months. When, in the greenhouse, conidia are placed behind leaf sheaths, spots develop on the sheath in 48 hr. and on the midrib within 6 days, lesions appearing on the under surface 1st and on the upper surface later, though the fungus could not be isolated from between the lesions. Atypical spores which form in the fibrovascular bundles and adjoining leaf cells may be important in spread in the leaf. Though spores placed on the surface of uninjured midribs do not cause lesions, the fungus can be isolated from such tissues and the germinating spores sometimes penetrate the waxy cuticle. Possibly such infections lie dormant until the vitality of mature leaves is lowered and then the fungus resumes growth and develops typical lesions.

Kar (K.). **Physiologic specialization in red rot pathogen.**—*Indian Sug.*, **8**, 12, pp. 797–799, 2 fig., 1959.

At the Main Sugarcane Res. Sta., Shahjahanpur, U.P., standing canes of 8 vars. were inoculated in Aug. 1957 with 8 isolates (all except 1 light-coloured) of *Glomerella tucumanensis* and examined 5 months later, when indications of physiologic specialization [**39**, 73] were revealed by differences in av. lesion lengths. Thus, Co. 213, 312, and 331 were susceptible to isolate S. 244 from Co. 312, with lesions measuring 102·1, 97·6, and 137 cm., respectively; Co. 453 and 421 were moderately resistant (49·7 and 41·2), and Co. S. 443 highly so (21·1). The dark strain R.115 was only mildly pathogenic (lesions 16·2–36 cm.) except to Co. 453 (74·8), from which it was isolated. Co. 453 and 421 were severely attacked by R.103, R.117, R.121, and R.123.

Cultural studies demonstrated variations in spore shapes among the several isolates, notably R.123. It is evident from these results that vars. should be tested before release in a given area against a number of isolates representing the local parasitic population.

Tepfer (S. S.) & Chessin (M.). **Effects of Tobacco mosaic virus on early leaf development in Tobacco.**—*Amer. J. Bot.*, **46**, 7, pp. 496–509, 25 fig., 1959.

At the Dept Biol., Univ. Ore., Eugene, and the Dept Bot., Mont. State Univ., Missoula, it was found that certain stages of infection of soil-grown seedlings of Xanthi Turkish tobacco inoculated with tobacco mosaic virus when 10 cm. tall and the terminal bud removed 7 days later [**12**, 538] were characterized by the formation of highly abnormal leaves classified in this paper as narrow-bladed and 'shoestring' leaves. The development and anatomy of these are described. The 'shoestring' leaf in its extreme form is entirely radial in symmetry, with no vestige of lamina. This suppression is expressed to a lesser degree in the narrow-bladed and in transitional forms and results directly from the absence or reduced activity of the marginal meristems of the leaf primordium. There is a general reduction in meristematic activity in the primordium that results in reduced length also.

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